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Subsistence Salmon Harvests in the Kuskokwim Area, 2017

**Annual Report for Study 14-352
USFWS Office of Subsistence Management
Fisheries Resource Monitoring Program**

by

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August 2021

Alaska Department of Fish and Game

Divisions of Sport Fish and Commercial Fisheries



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ABSTRACT

The Alaska Department of Fish and Game (ADF&G) in partnership with Orutsararmiut Native Council (ONC) in Bethel conducted a voluntary survey program to estimate subsistence salmon harvest for the Kuskokwim Management Area in 2017. Harvest information was collected through postseason household interviews and harvest calendars. Simple random sampling and stratified random sampling techniques were used, based on community size and user group designations, to select households to be interviewed. For the community of Bethel, subsistence salmon harvest information was collected by ONC. ADF&G surveyed the remaining communities in the Kuskokwim Management Area. In 2017, Kuskokwim Management Area subsistence users were subject to restrictions concerning the harvest of Chinook salmon. Households were surveyed in 28 communities in the Kuskokwim Management Area, including most communities along the Kuskokwim River and all communities within South Kuskokwim Bay. Subsistence salmon harvest estimates for 2017 were 22,150 Chinook *Oncorhynchus tshawytscha*, 54,459 chum *O. keta*, 53,522 sockeye *O. nerka*, 40,082 coho *O. kisutch*, and 2,291 pink salmon *O. gorbuscha*.

Key words: Chinook salmon, *Oncorhynchus tshawytscha*, chum salmon, *Oncorhynchus keta*, coho salmon, *Oncorhynchus kisutch*, pink salmon, *Oncorhynchus gorbuscha*, subsistence, harvest, Bethel, Aniak, Kuskokwim River, Kuskokwim Bay, Kuskokwim Area

INTRODUCTION

The purpose of this study was to quantitatively estimate the subsistence harvest of salmon, by species, in the Kuskokwim Management Area (KMA) using postseason subsistence salmon harvest surveys. At the time of this study, the Alaska Department of Fish and Game (ADF&G) do not require subsistence fishermen in the KMA to report their harvest and permits have not been required to participate in the subsistence fishery. This study was a continuation of the *Kuskokwim Area subsistence salmon monitoring program* (hereafter referred to as Monitoring Program). Data were collected about the number and species of salmon harvested by area residents and analyzed to provide an estimate of the number of salmon harvested for subsistence purposes in the KMA during the 2017 fishing season.

The KMA (Figure 1) subsistence salmon fishery is one of the largest in Alaska in terms of the number of residents who take part and the number of salmon harvested (Fall et al. 2014). Residents harvest all 5 locally occurring species of Pacific salmon for subsistence purposes: Chinook *Oncorhynchus tshawytscha*, chum *O. keta*, coho *O. kisutch*, sockeye *O. nerka*, and pink *O. gorbuscha* salmon.

Between 2010 and 2014, the Division of Subsistence conducted comprehensive subsistence harvest and use surveys in 23 KMA communities. The results indicated that salmon contributes an average of 40% of the total wild resource harvest (in edible pounds) in the Lower Kuskokwim communities from Eek to Tuluksak, 65% in the Central Kuskokwim communities from Lower Kalskag to Stony River, and 25% in the Upper Kuskokwim communities from McGrath to Nikolai (Brown et al. 2012, 2013; Ikuta et al. 2014; Ikuta and Koster 2012; Ikuta et al. 2016). Primary gear types used to harvest salmon include drift gillnets, set gillnets, fish wheels, and rod and reel (Hensel 1996). Dip nets were recently reintroduced as a tool for Chinook salmon conservation because of the ability to live release those fish.

Subsistence salmon harvest practices represent a complicated dynamic between culture, tradition, salmon biology, and local economy (Ikuta et al. 2013; Simon et al. 2007). Salmon harvest typically occurs between June and October, and families often move from permanent winter residences to summer fish camps situated along tributaries, sloughs, and main river channels. During these months, the daily activities of many KMA households revolve around subsistence fishing.

There are 38 traditionally recognized communities in the KMA, and 29 villages are targeted for annual surveys, based on logistics and voluntary involvement in the study (Table 1; Figure 1). The Lower Kuskokwim River villages from Eek to Tuluksak harvested an average of 78% of the total subsistence salmon between 2007 and 2016 (Appendices A1–A4). The Middle Kuskokwim River villages from Lower Kalskag to Chuathbaluk harvested an average of 10% of the total subsistence salmon between 2007 and 2016. The Upper Kuskokwim River communities harvested about 6% of the total, South Kuskokwim Bay communities harvested about 6% of the total harvest, and North Kuskokwim Bay communities harvested about 2% of the total harvest between 2007 and 2016 (Appendices A1–A4). This harvest distribution generally follows the human population distribution along the Kuskokwim River. The population distribution percentages calculated were Lower (80%), Middle (8%), and Upper (5%) Kuskokwim River communities; South Kuskokwim Bay communities (4%); and Kongiganak on North Kuskokwim Bay (3%; Shelden et al. 2015).

The North Kuskokwim Bay communities of Kwigillingok, Kongiganak, and Kipnuk are not located on the Kuskokwim River, but some subsistence salmon fishing households from these communities travel to the Kuskokwim River to fish as well as fishing in areas closer to their communities (Fall et al. 2014). The villages of the North Kuskokwim Bay have consistently declined to be surveyed and Kongiganak has not been surveyed since 2011 (Shelden et al. 2014).

The South Kuskokwim Bay communities of Quinhagak, Goodnews Bay, and Platinum harvest salmon from the Kanektok, Arolik, and Goodnews River drainages. South Kuskokwim Bay communities have consistently participated in KMA subsistence surveys (Appendices A1–A4).

Subsistence users from Bering Sea coastal communities have not participated in the ADF&G Monitoring Program most years. The communities of Mekoryuk (on Nunivak Island), Newtok, Tununak, Toksook Bay, Nightmute, and Chefnak typically harvest salmon from coastal waters and rivers near their communities (Simon et al. 2007; Wolfe et al. 2012).

Under Alaska regulation, legal subsistence fishing gear includes gillnet, beach seine, rod and reel, fish wheel, and spear (5 AAC 01.270). In 2014, the Alaska Board of Fisheries (BOF) approved the use dip nets in the Kuskokwim River during Chinook salmon conservation (5 AAC 01.270).

Annual documentation of the subsistence salmon harvest is necessary to determine if enough salmon are returning to KMA rivers to meet escapement and subsistence needs. Since 1960, the Monitoring Program has estimated salmon harvest through household surveys, harvest calendars, and postcard surveys. This information has been used by ADF&G, the U.S. Fish and Wildlife Service (USFWS), BOF, and the Federal Subsistence Board to manage and provide a reasonable opportunity for continued customary and traditional uses of salmon throughout the region. In 2013, using the results from the Monitoring Program, the BOF revised the recognized amounts of salmon reasonably necessary for subsistence (ANS) in the Kuskokwim River drainage based on ranges of recorded harvests of salmon in years of unrestricted subsistence harvest. These revised ranges are 67,200–109,800 Chinook, 41,200–116,400 chum, 32,200–58,700 sockeye, 27,400–57,600 coho, and 500–2,000 pink salmon (5 AAC 01.286b). A species-specific ANS range provided an index of the extent to which reasonable opportunity was provided in each subsistence fishery.

The BOF also revisited the ANS findings for the rest of the KMA. The BOF set an ANS of 6,900–17,000 salmon (not broken down by species) for the South Kuskokwim Bay communities of Quinhagak, Goodnews Bay, and Platinum. ANS are harder to determine for the remaining KMA communities, located along the Bering Sea coast, but available data document an annual use of 12,500–14,400 salmon (not broken down by species; Wolfe et al. 2012).

The goal of the survey is to provide a reliable annual estimate of subsistence salmon harvest in the KMA as a management tool. Questions are designed to determine the total subsistence harvest of salmon, regardless of the eventual use. Estimates include fish harvested to feed dogs, fish discarded as unfit for human consumption, fish given away as part of traditional sharing practices, and fish consumed by the fishing household. Data collected during this survey help fisheries managers by expanding their ability to assess the annual run strength of various salmon species, forecast the strength and age composition of future runs, set preseason management plans, and develop long-term management plans, including escapement goals. These data also help fisheries managers assess subsistence needs and identify whether harvestable surpluses will be available for subsistence, commercial, and sport fishing uses (Poetter and Tiernan 2017).

OBJECTIVES

The objectives of this study were as follows:

1. Conduct subsistence salmon harvest surveys to estimate the number of Chinook, chum, sockeye, coho, and pink salmon harvested for subsistence uses by residents of Bethel.
2. Conduct subsistence salmon harvest surveys to estimate the number of Chinook, chum, sockeye, coho, and pink salmon harvested for subsistence uses by residents of Aniak.
3. Conduct subsistence salmon harvest surveys to estimate the number of Chinook, chum, sockeye, coho, and pink salmon harvested for subsistence uses by residents of up to 26 Kuskokwim Area communities including communities on South Kuskokwim Bay.
4. Estimate subsistence salmon harvest by community.
5. Estimate total subsistence salmon harvests in the Kuskokwim Area.

METHODS

STUDY DESIGN

In 2017, household surveys were attempted in 28 of the 38 communities within the KMA, including most communities along the Kuskokwim River, and all communities within South Kuskokwim Bay. Except for Bethel (simple random sample), the Monitoring Program's postseason subsistence harvest survey design was based on stratified random survey methodology (Scheaffer et al. 1999). In this survey design, each household was the primary sampling unit. A household generally consists of 1 or more people living together in a dwelling and sharing the same mailing address. Multiple generations living in 1 dwelling would be considered a single household. Each household was classified into 1 of 5 strata based on the household's recent harvest history. The 5 stratifications of participation in the subsistence fishery are as follows:

1. High harvester: a household that has averaged a harvest of more than 200 salmon per year.
2. Medium harvester: a household that has averaged a harvest of 101–200 salmon per year.
3. Light harvesters: a household that has averaged a harvest of 1–100 salmon per year.
4. Usually does not fish: a household that did not participate in subsistence fishing activities.
5. Unknown: a household that has no harvest record during any of the last 5 years.

For this study, a fishing household was defined as a household that participated in subsistence fishing activities, such as harvesting or processing salmon. The household stratification was updated before the survey and was not re-assigned during the survey year (i.e., no post-survey

reclassification), except for unknown fishing households. From each stratum, survey households were selected randomly in the following percentages:

1. Heavy harvester: 100%.
2. Medium harvester: 100%.
3. Light harvester: 50%.
4. Usually do not fish: 30%.
5. Unknown: 100%.

When the number of households in each stratum was less than 10 households, all households in the stratum were surveyed. Likewise, when the total number of households in a community was less than or equal to 40, all households in the community were surveyed and the survey method became a census (100% surveyed).

In Bethel, approximately 25% random survey was conducted based on simple random survey methodology where each dwelling (physical location instead of household) was the primary sampling unit. Because Bethel is the main hub community of Western Alaska, its population is highly fluid and a high proportion of the population moves in and out of Bethel regularly. People often change dwellings, which makes it difficult to maintain an accurate and complete household list. A dwelling list for Bethel has been maintained and updated annually. Dwelling maps are developed from maps provided by the Bethel city planner's office. Maps and lists are compared and updated before the season and during the season, based on surveyor notes. Based on the updated list, 25–35 occupied dwellings were randomly selected for the survey, per surveyor, each day, 5 days a week. For each selected dwelling, at least 3 separate attempts to contact the household were required. Attempts were made on separate days and at different times of the day and at least 1 visit was made after 5:00 PM. Surveyors could visit a dwelling more than 1 time each day, but all the visits considered 1 daily attempt. Exceptions included an obviously abandoned or derelict dwelling or when contact was made, and the occupant declined to be surveyed. In these cases, the selected dwelling was dropped from the survey and replaced by another dwelling selected at random from those not previously selected. Progress of the survey in Bethel was tracked daily by monitoring household tracking sheets and attempts made by surveyors. The survey was continued until the total surveyed selected households reached about 25% of the occupied dwellings.

Postseason subsistence harvest surveys were conducted in early autumn when most salmon fishing was finished, but fishermen could still recall their harvest numbers because the season had ended recently. In Bethel, surveys were conducted by Orutsarmiut Native Council (ONC), and the other communities were surveyed by ADF&G, along with the help of LRAs. A cash prize drawing for participants was put in place to incentivize participation in the salmon survey.

Before conducting interviews, all surveyors (including ONC surveyors) were trained by ADF&G staff in surveying techniques, including directions about how to get the best information possible from people who are not accustomed to quantifying their fish harvest. Surveyors were trained in salmon species name identification because local names for salmon vary throughout the drainage. The surveyors were also briefed about fishery issues or concerns from the recent subsistence and commercial salmon fishing season, to improve understanding of community members' reactions and comments during surveys.

During the survey, the crew contacted community officials to notify them about the project and solicit support before arriving in the community to conduct surveys. The household lists were

annotated and corrected as the surveyors completed the survey process in the community. During interviews, both surveyors and surveyed individuals contributed to the quality of the estimate. Surveyors were expected to attempt contact with each selected household, ask questions consistently and understandably, and foster a cooperative atmosphere. Surveyors attempted to interview a member of each selected household, preferably the primary harvester. Surveyors sought out translators for those respondents who did not speak English as a primary language. Occasionally, interviews were conducted with households not preselected for the survey. Those households were either 1) new or previously unknown households found by surveyors, or 2) voluntarily provided surveyors with their harvest information.

All survey data were entered into the ADF&G subsistence harvest database, and harvest estimates were generated for the KMA. All subsistence harvest data were treated as confidential, such that individual harvest data were not shared, and all analysis was aggregate and anonymous. The study was generally conducted in accordance with the Alaska Federation of Natives' *Guidelines for Research* (AFN 2015).

THE SURVEY INSTRUMENT

The survey instrument was the same as previous years and the 2017 survey questions were similar to 2016 (Appendix B1). Most interview questions were designed to provide a quantitative assessment of each household's subsistence salmon harvest. A fishing household was identified by Question 3, which asked whether anyone in the household harvested salmon for subsistence use or kept fish for subsistence use from the commercial fishery (Appendix B1). The surveyor was instructed to clarify any participation in the subsistence fishery, such as cutting fish. Household harvest included salmon that members of the household gave away, ate fresh, fed to dogs, or lost to spoilage. To avoid double-counting between households, salmon received from other households (outside the fishing group) were not considered part of the household harvest because they were part of the harvest of the household that gave the fish.

Because individual household harvest forms the basis of salmon harvest estimates for this study, an effort was made to differentiate group harvest (several households fishing with or helping others) from individual household harvest to prevent bias. Households were asked about their harvest activities and whether they participated in group harvests or fished alone (Question 5 and 6). If surveyors identified a group harvest, they followed up by asking what portion of the group harvest the individual household had kept for itself (Question 7). This helped to prevent the possibility that a single large harvest might be reported by more than 1 member household of the fishing group defined in Question 5 (Appendix B1).

Households were also asked about salmon given to other families (outside of the fishing group), or whether they had received salmon from other subsistence households (outside of the fishing group), from a commercial fisherman, or a test fishery project. Households were also asked how many salmon were harvested for dog food.

Fishermen who did not know the actual number of fish harvested occasionally reported harvest in alternative terms, such as 5 gallon buckets, gallon and quart Ziploc bags, processed slabs or strips, or pounds in the round. ADF&G devised a conversion sheet to estimate fish numbers in these circumstances (Appendix C1).

Assessment of whether a household's subsistence needs were met, for fishing and non-fishing households, was attempted by asking respondents if they had met their subsistence needs for each

species of salmon. Possible answers were yes (needs met), no (needs not met), or no need. Respondents who reported that they did not meet their needs were asked to further describe why their needs were not met for that species. Responses were divided into 2 categories for analysis: households that participated in harvesting salmon, and households that did not participate in harvesting salmon. For this analysis, responses from the second group were not included. These households would probably receive salmon later in the year, and therefore an assessment of harvest needs and success was premature at the time of the surveys.

After the households were interviewed, survey forms were reviewed for completeness, legibility, and accuracy. Occasionally, fishing group members simply did not agree on numbers for salmon harvest. In this event, ADF&G staff made a judgment on how to best represent the fish harvest on the appropriate survey forms, and priority was always given to ensuring the accuracy of the household harvest over the group harvest. Data from all surveys were checked and key-entered into the subsistence database. Each record was then rechecked by a different individual and run through a program to identify discrepancies, which were corrected for accuracy.

HARVEST CALENDARS

In addition to the household harvest survey, subsistence salmon harvest calendars were distributed in late April or early May each year by mass mailing to households identified as those who usually fish to ensure they were available to fishermen prior to the start of the salmon fishing season. The calendar has been helpful to examine subsistence harvest timing and helps fishermen keep track of their daily salmon harvest for reference during postseason surveys.

Extra calendars were kept at the Bethel ADF&G office for distribution as needed or upon request. During the survey, respondents were also given the opportunity to be added to the ADF&G mailing list for future calendar distributions. To increase the use and return rate of subsistence calendars, public service announcements were broadcast on local radio stations inseason reminding fishermen to keep their calendars up to date and describing the importance of calendars for documenting subsistence use. Flyers describing the importance of subsistence calendars and the postseason subsistence survey project were also distributed to local communities to post in public locations such as council offices, local stores, and post offices.

Data from the returned calendars are not normally used to directly generate KMA harvest estimates. Because harvest calendars may contain harvest information from 1 or multiple households, data from returned calendars were not used to compare or complete harvest surveys. However, occasionally a survey respondent would instruct surveyors to take harvest numbers directly from a calendar, either returned during the survey or mailed in before the survey.

DATA ANALYSIS

Harvest Estimation

Expanded Community Harvest

Subsistence salmon harvest reported by sampled households was expanded to estimate the total community harvest, by species, using a stratified random sampling expansion technique (Scheaffer et al. 1999). The stratified expansion procedure was performed for a community only if enough households were sampled.

For harvests of each stratum, if 10 or fewer households were surveyed, and the proportion of surveyed households was less than 0.25 (for non- and light harvesters) or 0.3 (for other strata),

then harvest expansion was not conducted. For estimates of community harvest, if the total number of surveyed households in each stratum was less than 50 and the proportion of surveyed households was less than 0.3, total community harvest was not estimated using this method.

Denote that:

N_{kj} is the number of households in the stratum ($j = 5$: unknown, usually do not harvest, light harvest, medium harvest, and heavy harvest) of the community (k);

n_{kj} is the number of surveyed households in the stratum of the community (k);

y_{kji} is the response of surveyed household (i) ($i = 1 \dots n_{kj}$) in the stratum (j) of the community (k); e.g., the number of fish harvested by a household.

The mean household response in the stratum of the community (\bar{y}_{kj}) was calculated as:

$$\bar{y}_{kj} = \frac{\sum_{i=1}^{n_{kj}} y_{kji}}{n_{kj}}. \quad (1)$$

The standard error of mean household response (SE_{kj}) was calculated as:

$$SE_{kj} = \sqrt{\frac{s_{kj}^2}{n_{kj}} \left(\frac{N_{kj} - n_{kj}}{N_{kj}} \right)} \quad \text{where} \quad s_{kj}^2 = \frac{\sum_{i=1}^{n_{kj}} (y_{kji} - \bar{y}_{kj})^2}{n_{kj} - 1}. \quad (2)$$

The estimate of the total harvest of the community (\hat{T}_k) was calculated as:

$$\hat{T}_k = \sum_{j=1}^5 N_{kj} \bar{y}_{kj}. \quad (3)$$

The 95% confidence interval of total community harvest (95% CI_k) was calculated as:

$$95\% \text{CI}_k = t_{(0.025, df=n-1)} \cdot \sqrt{\hat{V}(T_k)} \quad \text{where} \quad \hat{V}(T_k) = \sum_{j=1}^5 N_{kj}^2 \left(\frac{N_{kj} - n_{kj}}{N_{kj}} \right) \left(\frac{s_{kj}^2}{n_{kj}} \right). \quad (4)$$

When a single stratum was not surveyed, the total harvest of a community (\hat{T}_k) was calculated as:

$$\hat{T}_k = \left(\frac{\sum_{j=1}^5 N_{kj}}{\sum_{j=1}^4 N_{kj}} \right) \sum_{j=1}^4 N_{kj} \bar{y}_{kj}. \quad (5)$$

The 95% confidence interval of total community harvest when a single stratum was not surveyed (95% CI_k) was calculated as:

$$95\%CI_k = t_{(0.025,df=n-1)} \cdot \sqrt{\hat{V}(T_k)} \text{ where } \hat{V}(T_k) = \left(\frac{\sum_{j=1}^5 N_{kj}}{\sum_{j=1}^4 N_{kj}} \right)^2 \sum_{j=1}^4 N_{kj}^2 \left(\frac{N_{kj} - n_{kj}}{N_{kj}} \right) \left(\frac{s_{kj}^2}{n_{kj}} \right). \quad (6)$$

The above methods were used to estimate salmon harvests (Question 7) and the number of people (Question 2).

To estimate the number of subsistence fishing households in each community, the following expansion method was used.

Denote that:

$n_{kj(s)}$ is the number of surveyed households that subsistence fish in the stratum (j) of the community (k); and

n_{kj} is the number of surveyed households in the stratum (j) of the community (k).

Then, the proportion of households who subsistence fish in the stratum (j) of the community (k) ($\hat{p}_{kj(s)}$) was calculated as:

$$\hat{p}_{kj(s)} = \frac{n_{kj(s)}}{n_{kj}} \quad (7)$$

The estimated number of households that subsistence fish in the community ($\hat{N}_{k(s)}$) was calculated as:

$$\hat{N}_{k(s)} = \sum_{j=1}^5 N_{kj} \hat{p}_{kj(s)} \quad (8)$$

The 95% confidence interval (95% CI_k) was calculated as:

$$95\%CI_k = t_{(0.025,df=n-1)} \cdot \sqrt{\hat{V}(\hat{N}_{k(s)})} \text{ where} \\ \hat{V}(\hat{N}_{k(s)}) = \sum_{j=1}^5 N_{kj}^2 \left(\frac{N_{kj} - n_{kj}}{N_{kj}} \right) \left(\frac{\hat{p}_{kj(s)}(1 - \hat{p}_{kj(s)})}{n_{kj} - 1} \right) \quad (9)$$

Harvest Estimation of Non-surveyed and Under-surveyed Communities

Harvests of several communities were not estimated in some years because surveys were not conducted, or survey data were insufficient. Harvests of those communities were estimated by employing a Bayesian hierarchical multiple imputation method (Honaker and King 2010; King et al. 2001). This method assumed that 1) events that cause missing harvest data follow a missing at random process (MAR), and 2) harvest data possess multivariate normal distribution.

Under these conditions, the harvest in a given year and community can be estimated from the harvest estimates of that community in previous years and harvest estimates of surrounding

communities during the same period. For instance, the 2008 harvest of the community of Tuntutuliak (un-surveyed in that year) was estimated using its known harvests during 1990–2007 and harvests of other Lower Kuskokwim communities during the entire period, 1990–2008. This estimation method applies only to communities with several years of annual harvest estimates. It is further based on assumptions that fishing characteristics of communities (e.g., proportion of fishing households, demand, and effort) are constant over time, and changes in average household harvests are primarily due to the abundance of fish or fishing regulations that affect all communities. Communities were grouped according to geographic subareas within the KMA on the assumption that harvests within each subarea would be more similar than harvests in other subareas. The 4 geographic subareas were: 1) Lower Kuskokwim River and Kongiganak, 2) Middle Kuskokwim River, 3) Upper Kuskokwim River, and 4) South Kuskokwim Bay.

For the communities (K) within a given geographic subarea, let $D_{kj.obs}$ denote the observed data (average harvest per household) for the community ($k = 1, \dots, K$) in a year (j). In application, the average household harvest $D_{kj.obs}$ was the log-transformed average household harvest ($D_{kj.obs} = \log(T_{kj}/N_{kj} + I)$), where T_{kj} was the total community harvest and N_{kj} was the total number of households in the community (K) during the year (j).

It was assumed that the $D_{kj.obs}$ arose from an underlying multivariate normal distribution in which $\boldsymbol{\mu}_K$ is a vector of mean annual household harvest in the communities (K) within the subarea and $\boldsymbol{\Sigma}$ is a $K \times K$ covariance matrix:

$$D_{kj.obs} \sim \mathbf{N}(\boldsymbol{\mu}_K, \boldsymbol{\Sigma}) \quad (10)$$

In the Bayesian hierarchical model, it was further assumed that $\boldsymbol{\mu}_K$ and $\boldsymbol{\Sigma}$ themselves arose from some other, unknown distribution. A normal prior distribution was assigned for $\boldsymbol{\mu}_K$, with mean (μ) and variance (σ^2), and a Wishart distribution with $K \times K$ dimensions for $\boldsymbol{\Sigma}$:

$$\begin{aligned} \boldsymbol{\mu}_K &\sim N(\mu, \sigma^2) \\ \boldsymbol{\Sigma} &\sim W(I_K, K) \end{aligned} \quad (11)$$

Then, the posterior distributions for $\boldsymbol{\mu}_K$ and $\boldsymbol{\Sigma}$ were derived as:

$$\tilde{\boldsymbol{\mu}}_K, \tilde{\boldsymbol{\Sigma}} \sim P(\boldsymbol{\mu}_K, \boldsymbol{\Sigma} | D_{kj.obs}) \quad (12)$$

A predicted value for missing data ($D_{kj.mis}$), was derived from random draws from the posterior distribution for $\boldsymbol{\mu}_K$ and $\boldsymbol{\Sigma}$:

$$\tilde{D}_{kj.mis} \sim P(D_{kj.mis} | D_{kj.obs}, \tilde{\boldsymbol{\mu}}_K, \tilde{\boldsymbol{\Sigma}}) \quad (13)$$

For the Bayesian estimation, WinBUGS 1.4.3 (Lunn et al. 2000) was used, with default initial values. A total of 55,000 imputations were generated (after discarding 5,000 initial burn-in iterations) and the mean value of these imputations was calculated. The resulting mean household harvest was back-transformed and multiplied by the number of households in the community that year to estimate the unknown total community harvest. Total community harvest was calculated as:

$$\tilde{T}_{kj} = N_{kj} \exp(\tilde{D}_{kj.mis}) \quad (14)$$

and its 95% confidence interval was estimated as:

$$95\%CI = N_{kj} \exp\left(1.96 \cdot \sqrt{V(\tilde{D}_{kj.mis})}\right), \quad (15)$$

where $V(\tilde{D}_{kj.mis})$ is the standard deviation of the Bayesian estimate. Estimation of missing data within a given subarea was independent of estimates in other subareas.

Total Kuskokwim Management Area Harvest

The total number of salmon harvested in the KMA (\hat{T}) was estimated by summing harvest estimates of all communities (across all geographic subareas):

$$\hat{T} = \sum_{k=1} \hat{T}_k, \quad (16)$$

and its 95% confidence interval (95% CI) was calculated as:

$$95\%CI = t_{(0.025, df=n-1)} \cdot \sqrt{\hat{V}(T)} \text{ where } \hat{V}(T) = \sum_{k=1} \hat{V}(T_k). \quad (17)$$

RESULTS

HOUSEHOLD SELECTION AND SURVEY

In 2017, project surveyors visited and successfully surveyed 28 targeted communities (Table 2; Appendix A). A total of 1,706 households were selected for the survey. Of these, 1,602 were contacted and another 179 households were non-selected or previously unknown. Together these households represented a survey of 39% of KMA households. Of the preselected households, 201 refused to participate in the survey (Table 2).

HARVEST ESTIMATES

In 2017, survey results were stratified and expanded for each community (Tables 3–7). The salmon harvest for Kongiganak (not surveyed in 2017) would normally have been estimated using Bayesian methods previously described. However, this village has not been successfully visited often or consistently enough to provide a useful estimate via this method (Appendices A1–A4).

The total estimated Chinook salmon harvest by species for the KMA (in communities for which estimates could be made) was 22,150 (95% CI +/- 1,571). Estimates for other salmon species, based solely on subsistence surveys, were 54,459 (95% CI +/- 4,324) chum, 53,522 (95% CI +/- 3,601) sockeye, 40,082 (95% CI +/- 5,084) coho, and 2,291 (95% CI +/- 513) pink salmon (Table 8). Overall, an estimated 172,504 salmon were harvested in 2017 for subsistence use (Table 8).

Harvest estimates for households that participated in commercial fishing included salmon retained for subsistence use from that activity. Historically, salmon retained from commercial fishing were most commonly reported in the areas within or adjacent to commercial fishing districts, such as north and South Kuskokwim Bay and the Lower Kuskokwim River (Table 9). In 2017, there were no large-scale commercial fish buyers present in the KMA and no major commercial fishing opportunities were provided (Table 9).

PRIMARY FISHING GEAR

In 2017, most responding households throughout the KMA reported that the primary gear type used for subsistence salmon fishing was drift gillnets. Drift gillnets were reported as the primary harvest method (1,576 households), followed by hook and line (179 households) and set gillnets (159 households) (Table 10). Gear type estimates were not expanded.

ESTIMATED FISHING HOUSEHOLDS, COMMUNITY POPULATION SIZE, AND HOUSEHOLDS RECEIVING SALMON

In 2017, 1,985 households participated in the subsistence salmon fishery (Table 11) and the total estimate of people living in surveyed communities of the KMA in 2017 was 14,618 (Table 12).

Within the KMA subsistence fishery, the traditional practice of sharing the harvest is an integral part of subsistence-based economies. Sharing is defined here as the immediate distribution (giving or receiving) of salmon, upon harvest, to households outside of one's subsistence salmon harvest and processing work group. In 2017, based on answers provided, an estimated 2,050 (95% CI +/- 307) Chinook, 4,622 (95% CI +/- 940) chum, 5,227 (95% CI +/- 851) sockeye, 4,381 (95% CI +/- 713) coho, and 0 pink salmon were shared by subsistence fishermen with other community members (Table 13). In 2017, no fish were reported as shared between commercial fishermen and other area residents (Table 14).

In 2017, the long running ADF&G Bethel test fishery a test fishery near Aniak operated by Napaimute traditional council, and a sonar project operated by ADF&G near Kwethluk enumerated salmon in the KMA. All 3 projects donated caught salmon to local communities. The Bethel test fishery reported catches of 290 Chinook, 3,471 chum, 1,354 sockeye, 1,952 coho, and 61 pink salmon, most of which were distributed to residents in Bethel, Kwethluk, Napaskiak, Eek, and Red Devil in cooperation with ONC (Lipka and Tiernan 2018). It is unknown exactly how many fish of each species were distributed in each village or whether other villages were involved. The Aniak test fishery reported catches of 768 Chinook, 1,274 chum, and 44 sockeye salmon, and most fish were distributed within the village of Aniak (Dan Gillikan, Biologist, Napaimute Village Council; personal communication). The sonar project near Kwethluk (Kuskokwim River) reported catches of 154 Chinook, 1,260 chum, 1,343 sockeye, 33 coho, and 77 pink salmon, and most salmon were distributed to the community of Kwethluk and fish camps located near the sonar site.

SUBSISTENCE USE OF SALMON FOR DOG FOOD

In 2017, 2,253 respondents reported owning a combined total of 4,917 dogs. An estimated 143 Chinook, 6,493 chum, 7,482 sockeye, 12,275 coho, and 2,426 pink salmon were fed to dogs (Table 15).

LOST FISH

In 2017, 1,776 respondents reported 8,551 salmon as lost for reasons such as spoilage, animal predation, etc. (Table 16). Out of the 420 households that provided a reason for losing fish, 181 reported weather-related reasons such as rain, mold, flies, or spoilage; 14 reported animal predation by bears, birds, or otters; and 11 reported disease. Other reasons for loss included equipment issues, personal difficulty, and river conditions (Table 16).

SUBSISTENCE SALMON NEEDS

In 2017, 374 respondents reported no need for Chinook salmon. Of those reporting a need for this species, an estimated 397 respondents met their needs (Table 17). Of the 888 respondents who provided a reason for not meeting their needs, 477 indicated this was due to non-fishery related factors such as age, difficulties with equipment, the high price of fuel, work conflicts, or having given away too many of the fish they harvested. A total of 42 respondents cited natural conditions, including run dynamics (low abundance or timing of the run), river conditions (flooding, clarity, debris load), and inclement weather. A total of 351 respondents cited fisheries management decisions as the reason they did not meet their needs. A total of 9 reported intentionally abstaining for conservation reasons. A total of 5 respondents reported human theft or animal interference (bears, birds, etc.) as a contributing factor to not meeting their needs (Table 17).

Regarding needs met for chum salmon, 534 respondents stated that they do not generally fish for this species. Of those reporting a need for this species, 719 met their needs (Table 18). Of the 423 respondents that indicated that they had not met their needs for chum salmon, 339 cited non-fishery related reasons and 10 cited natural condition similar to those given for Chinook salmon. Approximately 72 of respondents cited fisheries management decisions as the reason they did not meet their needs. The remaining respondents reported animal and human interference as reasons for not meeting their needs (Table 18).

Regarding needs met for sockeye salmon, 366 of respondents stated that they do not generally fish for this species. Of those reporting a need for this species, 718 met their needs (Table 19). Of the 581 respondents that indicated that they had not met their needs for sockeye salmon, 427 cited non-fishery related reasons and 16 cited natural conditions similar to those given for Chinook salmon. A total of 134 respondents cited fisheries management decisions as the reason they did not meet their needs. The remaining respondents reported animal and human interference as reasons for not meeting their needs (Table 19).

Regarding needs met for coho salmon, 471 of respondents stated that they do not generally fish for this species. Of those reporting a need for this species, 639 met their needs (Table 20). Of the 552 respondents that indicated that they had not met their needs for coho salmon, 467 cited non-fishery related reasons and 33 cited natural conditions similar to those given for Chinook salmon. A total of 50 respondents cited fisheries management decisions as the reason they did not meet their needs (Table 20). The 2 remaining respondents reported animal and human interference as reasons for not meeting their needs (Table 20).

REPORTED AND ESTIMATED HARVEST OF NON-SALMON SPECIES

In 2017, estimates for the harvest of non-salmon species were expanded like salmon. Based on these estimates, the most heavily harvested species in the KMA appear to be blackfish (*Dallia pectoralis*) and smelt (*Osmerus mordax*). These species were each harvested in numbers that compared to all salmon combined: 141,936 (95% CI +/- 84,742) blackfish and 128,593 (95% CI +/- 40,278) smelt versus 172,504 total salmon (Tables 8, 21, and 22).

After blackfish, salmon, and smelt, the most heavily harvested species was 91,393 (95% CI +/- 30,064) northern pike (*Esox lucius*). All other species were harvested in numbers less than half those of northern pike (Tables 21 and 22).

Non-salmon species were most heavily harvested in the Lower Kuskokwim River. Only Arctic grayling (*Thymallus arcticus*), Arctic char (*Salvelinus alpinus*), and Dolly Varden (*S. malma*) were more heavily harvested in areas other than the Lower Kuskokwim River. Arctic char and Dolly Varden were harvested most among South Kuskokwim Bay communities, and Arctic grayling were harvested most among Upper Kuskokwim River communities (Table 22).

HARVEST CALENDARS

In 2017, households returned a total of 104 subsistence harvest calendars out of the 1,874 issued, which was approximately 6% of the total issued. Additional incentives were offered by ADF&G to boost return rates.

DISCUSSION

HARVEST ESTIMATES

In 2017, the total subsistence harvest of Chinook salmon was below the 5-year average of 29,440 fish and was greater than 2015 but less than 2016 harvest estimates (Figures 2 and 3; Appendix A1). All sections of the Kuskokwim River reported this trend in 2017 (Figure 3; Appendix A1). South Kuskokwim Bay communities have shown some variation in Chinook salmon harvest over the last several years and 2016 and 2017 had the largest Chinook harvest estimates since 2007 (Figure 4).

In 2017, the total subsistence harvest of chum salmon was below the 5-year average of 59,270 fish (Appendix A2). The shift in harvest from Chinook to chum salmon observed in response to heavy restriction of Chinook salmon harvest in 2012 and 2014 did not appear in 2017 (Figure 5). The subsistence harvest of 3,740 fish in the Upper Kuskokwim River, 6,859 Middle Kuskokwim River, and 45,893 Lower Kuskokwim River were below the 5-year averages. The South Kuskokwim Bay communities' chum salmon harvest was consistent with the 5-year average harvest of 1,788 fish (Figure 6).

The total harvest of sockeye salmon was above the 5-year average harvest of 48,013 fish (Appendix A3). The overall increase in sockeye salmon harvest is probably attributed to the Middle Kuskokwim River where additional fish wheels became active in 2016 and operated again in 2017 (Figure 7). Subsistence sockeye salmon harvests of 36,625 in the Lower Kuskokwim River, 4,980 in the Middle Kuskokwim River, and 2,384 in the Upper Kuskokwim River were above the 5-year averages. The South Kuskokwim Bay communities' sockeye salmon harvest was well above the 5-year average of 3,310 fish and most of the harvest (3,850) was taken near the village of Quinhagak (Figure 8).

The total harvest of coho salmon was slightly above the 5-year average harvest of 37,344 fish (Figure 9; Appendix A4). The Lower Kuskokwim River harvest was well above the 5-year average of 24,141 fish but the Upper Kuskokwim River harvest of 2,893 and Middle Kuskokwim River harvest of 7,720 was below the 5-year averages (Figure 10; Appendix A4). The South Kuskokwim Bay communities' coho salmon harvest was consistent with the 5-year average of 2,324 fish (Figure 10; Appendix A4).

AMOUNTS NECESSARY FOR SUBSISTENCE

In 2017, the relative success of Kuskokwim River salmon harvests was mixed. Harvest of Chinook and coho salmon was below the ANS ranges (5 AAC 01.286). Subsistence harvests of chum and

sockeye salmon in the Kuskokwim River were within the ANS ranges, and pink salmon harvest exceeded the ANS range defined for the drainage.

The Kuskokwim Bay ANS determination was not broken down by species (5 AAC 01.286). South Kuskokwim Bay harvest was determined to be within the range of ANS for that subarea (Table 8; Appendices A1–A4). ANS for the North Kuskokwim Bay and Bering Sea coastal communities fall under the remainder of the KMA description. In 2017, none of these communities directly participated in the survey and it was not possible to determine the status of ANS for this subarea.

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TABLES AND FIGURES

Table 1.–Kuskokwim Area communities by geographic location.

Geographic area	Community
North Kuskokwim Bay	Kipnuk ^a
	Kwigillingok ^a
	Kongiganak ^a
Lower Kuskokwim	Tuntutuliak
	Eek
	Kasigluk
	Nunapitchuk
	Atmautluak
	Napakiak
	Napaskiak
	Oscarville
	Bethel
	Kwethluk
	Akiachak
	Akiak
	Tuluksak
Middle Kuskokwim	Lower Kalskag
	Upper Kalskag
	Aniak
	Chuathbaluk
Upper Kuskokwim	Crooked Creek
	Red Devil
	Sleetmute
	Stony River
	Lime Village ^b
	McGrath
	Takotna
	Nikolai
	Telida ^c
South Kuskokwim Bay	Quinhagak
	Goodnews Bay
	Platinum
Bering Sea Coast	Mekoryuk ^a
	Newtok ^a
	Nightmute ^a
	Toksook Bay ^a
	Tununak ^a
	Chefornak ^a

^a The community was not surveyed in 2015 because residents chose as a group not to participate in the study.

^b The community was not surveyed in 2015 for logistical reasons.

^c The community is essentially no longer significant, operating as a seasonal fish camp for a small number of families that spend winters in other locations.

Table 2.–Households selected and surveyed by user group, 2017.

Community	Unknown					Does not usually fish					Light harvester					Medium harvester					High harvester					Combined use groups							
	<i>N</i>	<i>S</i>	<i>ns</i>	<i>U</i>	<i>PC</i>	<i>N</i>	<i>S</i>	<i>ns</i>	<i>U</i>	<i>PC</i>	<i>N</i>	<i>S</i>	<i>ns</i>	<i>U</i>	<i>PC</i>	<i>N</i>	<i>S</i>	<i>ns</i>	<i>U</i>	<i>PC</i>	<i>N</i>	<i>S</i>	<i>ns</i>	<i>U</i>	<i>PC</i>	<i>N</i>	<i>S</i>	<i>ns</i>	<i>U</i>	<i>PC</i>	<i>R</i>	<i>n</i>	<i>PS</i>
Kongiganak	–	–	–	–	–	14	5	0	0	0.00	62	31	0	0	0.00	12	12	0	0	0.00	2	2	0	0	0.00	90	50	0	0	0.00	0	–	0%
N. Kusk. Bay	–	–	–	–	–	14	5	0	0	0.00	62	31	0	0	0.00	12	12	0	0	0.00	2	2	0	0	0.00	90	50	0	0	0.00	0	–	0%
Tuntutuliak	10	1	1	8	9.00	33	11	10	0	0.91	43	22	21	1	1.00	21	21	20	0	0.95	4	4	3	0	0.75	111	59	55	9	1.08	3	61	55%
Eek	9	0	0	9	–	35	12	11	0	0.92	46	24	23	0	0.96	9	9	8	0	0.89	–	–	–	–	–	99	45	42	9	1.13	2	49	49%
Kasigluk	8	1	1	7	8.00	39	11	11	0	1.00	58	29	29	1	1.03	10	10	9	0	0.90	4	4	4	0	1.00	119	55	54	8	1.13	1	61	51%
Nunapitchuk	8	1	1	6	7.00	34	11	10	0	0.91	56	28	27	4	1.11	14	14	13	0	0.93	9	9	9	0	1.00	121	63	60	10	1.11	1	69	57%
Atmautluak	10	3	3	7	3.33	18	6	6	0	1.00	29	13	12	2	1.08	11	10	10	1	1.10	3	3	3	0	1.00	71	35	34	10	1.26	0	44	62%
Napakiak	7	1	1	6	7.00	32	10	10	0	1.00	41	20	17	1	0.90	15	15	14	0	0.93	3	3	3	0	1.00	98	49	45	7	1.06	5	47	48%
Napaskiak	12	1	1	11	12.00	34	11	11	0	1.00	42	21	20	0	0.95	13	13	11	0	0.85	4	4	4	0	1.00	105	50	47	11	1.16	3	55	52%
Oscarville	1	0	0	1	–	1	1	1	0	1.00	10	10	9	0	0.90	2	2	2	0	1.00	–	–	–	–	–	14	13	12	1	1.00	0	13	93%
Bethel	–	–	–	–	–	–	–	–	–	–	1,844	560	560	0	1.00	–	–	–	–	–	–	–	–	–	1,844	560	560	0	1.00	147	413	22%	
Kwethluk	11	5	4	6	2.00	51	16	16	0	1.00	87	44	44	4	1.09	19	19	19	0	1.00	5	5	5	0	1.00	173	89	88	10	1.10	2	96	55%
Akiachak	14	1	1	11	12.00	48	12	11	3	1.17	85	41	40	2	1.02	18	18	18	0	1.00	4	4	4	0	1.00	169	76	74	16	1.18	7	83	49%
Akiak	10	2	2	6	4.00	28	7	7	0	1.00	32	16	16	0	1.00	11	11	10	0	0.91	10	10	9	0	0.90	91	46	44	6	1.09	5	45	49%
Tuluksak	9	1	1	7	8.00	27	9	9	1	1.11	47	21	21	1	1.05	13	13	13	0	1.00	1	1	1	0	1.00	97	45	45	9	1.20	2	52	54%
Lower Kusk.	109	17	16	85	5.94	380	117	113	4	1.00	2,420	849	839	16	1.01	156	155	147	1	0.95	47	47	45	0	0.96	3,112	1,185	1,160	106	1.07	178	1,088	35%
Lower Kalskag	7	1	1	6	7.00	34	9	9	2	1.22	40	20	18	0	0.90	4	4	4	0	1.00	–	–	–	–	–	85	34	32	8	1.18	4	36	42%
Upper Kalskag	5	2	2	3	2.50	18	4	3	0	0.75	26	14	14	0	1.00	4	4	4	0	1.00	5	5	4	0	0.80	58	29	27	3	1.03	4	26	45%
Aniak	12	1	1	11	12.00	66	18	14	1.00	0.83	77	37	33	0	0.89	7	7	7	0	1.00	5	5	5	0	1.00	167	68	60	12	1.06	5	67	40%
Chuathbaluk	3	0	0	3	–	6	6	6	0	1.00	21	21	18	0	0.86	1	1	1	0	1.00	1	1	1	0	1.00	32	29	26	3	1	2	27	84%
Middle Kusk.	27	4	4	23	6.75	124	37	32	3	0.95	164	92	83	0	0.90	16	16	16	0	1.00	11	11	10	0	0.91	342	160	145	26	1.07	15	156	46%
Crooked Creek	5	0	0	5	–	10	10	10	0	1.00	15	15	14	0	0.93	–	–	–	–	–	3	3	3	0	1.00	33	28	27	5	1.14	0	32	97%
Red Devil	–	–	–	–	–	1	1	0	0	0.00	4	4	4	0	1.00	3	3	3	0	1.00	–	–	–	–	–	8	8	7	0	0.88	0	7	88%
Sleetmute	2	0	0	2	–	7	7	7	0	1.00	20	20	19	0	0.95	–	–	–	–	–	2	2	1	0	0.50	31	29	27	2	1.00	2	27	87%
Stony River	3	0	0	3	–	4	4	3	0	0.75	7	6	5	1	1.00	–	–	–	–	–	–	–	–	–	14	10	8	4	1.20	1	11	79%	
Lime Village	–	–	–	–	–	2	2	2	0	1.00	3	3	2	0	0.67	1	1	1	0	1.00	1	1	1	0	1.00	7	7	6	0	0.86	0	6	0%
McGrath	10	0	0	9	–	73	19	19	1	1.05	37	18	18	3	1.17	3	3	3	0	1.00	1	1	1	0	1.00	124	41	41	13	1.32	1	53	43%
Takotna	4	1	1	3	4.00	17	17	17	0	1.00	4	4	4	0	1.00	–	–	–	–	–	–	–	–	–	25	22	22	3	1.14	0	25	100%	
Nikolai	1	0	0	1	–	19	19	19	0	1.00	10	10	8	0	0.80	–	–	–	–	–	1	1	1	0	1.00	31	30	28	1	0.97	0	29	94%
Telida	–	–	–	–	–	–	–	–	–	–	2	1	0	0	0.00	–	–	–	–	–	–	–	–	–	2	1	0	0	0.00	–	–	–	0%
Upper Kusk.	25	1	1	23	24.00	133	79	77	1	0.99	102	81	74	4	0.96	7	7	7	0	1.00	8	8	7	0	0.88	275	176	166	28	1.10	4	190	69%
Kusk. R. Total	161	22	21	131	6.91	637	233	222	8	0.99	2,686	1,022	996	20	0.99	179	178	170	1	0.96	66	66	62	0	0.94	3,729	1,521	1,471	160	1.07	197	1,434	38%
Quinhagak	12	1	1	10	11.00	33	11	11	0	1.00	111	55	53	3	1.02	15	15	15	0	1.00	2	2	2	0	1.00	173	84	82	13	1.13	4	91	53%
Goodnews Bay	3	1	1	2	3.00	18	6	6	0	1.00	53	27	26	0	0.96	1	1	1	0	1.00	1	1	1	0	1.00	76	36	35	2	1.03	0	37	49%
Platinum	3	0	0	3	–	5	5	4	0	0.80	10	9	9	1	1.11	1	1	1	0	1.00	–	–	–	–	–	19	15	14	4	1.20	0	18	95%
S. Kusk. Bay	18	2	2	15	8.50	56	22	21	0	0.95	174	91	88	4	1.01	17	17	17	0	1.00	3	3	3	0	1.00	268	135	131	19	1.11	4	146	54%
Total	179	24	23	146	7.04	707	260	243	8	0.97	2,922	1,144	1,084	24	0.97	208	207	187	1	0.91	71	71	65	0	0.92	4,087	1,706	1,602	179	1.04	201	1,580	39%

Note: Dashes indicate data are unavailable. Headings are defined as follows: *N* = the total number of households, *S* = number selected for survey, *ns* = number selected and surveyed, *U* = number of unselected houses that were surveyed, *PC* = the proportion of selected households contacted, *R* = number of contacted households that refused survey, *n* = total number of households surveyed (*ns* + *U* – *R* = *n*), and *PS* = the percentage of households surveyed.

Table 3.—Expanded harvest of Chinook salmon for communities surveyed, Kuskokwim Area, 2017.

Community	Unknown				Not usually harvest				Light harvesters				Medium harvesters				High harvesters				Combined use groups			
	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	Total <i>N</i>	Total <i>n</i>	Est. Total	CI (95%)
Kongiganak	–	–	–	–	14	0	–	–	62	0	–	–	12	0	–	–	2	0	–	–	90	0	–	–
Tuntutuliak	10	8	1	0	33	9	2	1	43	22	13	2	21	20	33	1	4	3	37	6	111	62	1,459	224
Eek	9	9	2	0	35	11	6	3	46	23	7	2	9	8	30	4	–	–	–	–	99	51	825	264
Kasigluk	8	6	1	0	39	10	0	0	58	29	8	1	10	8	11	1	4	3	45	4	119	56	791	172
Nunapitchuk	8	7	2	0	34	6	0	0	56	25	8	4	14	13	13	1	9	9	11	0	121	60	761	391
Atmautluak	10	10	2	0	18	6	0	0	29	13	4	1	11	11	6	0	3	3	5	0	71	43	195	56
Napakiak	7	7	2	0	32	10	0	0	41	18	7	2	15	14	11	1	3	3	7	0	98	52	505	191
Napaskiak	12	8	0	0	34	10	1	0	42	17	16	4	13	10	8	1	4	4	16	0	105	49	858	342
Oscarville	1	0	–	–	1	1	0	–	10	8	8	2	2	2	18	0	–	–	–	–	14	11	122	56
Bethel	–	–	–	–	–	–	–	–	1,844	490	3	0	–	–	–	–	–	–	–	–	1,844	490	5,336	1,154
Kwethluk	11	10	2	0	51	16	1	1	87	48	6	1	19	19	22	0	5	5	11	0	173	98	1,019	151
Akiachak	14	12	6	1	48	10	2	1	85	38	11	2	18	18	11	0	4	4	34	0	169	82	1,415	353
Akiak	10	7	10	3	28	7	2	1	32	15	8	2	11	10	4	1	10	8	24	4	91	47	694	166
Tuluksak	9	7	0	0	27	9	2	1	47	20	7	2	13	13	11	0	1	1	0	–	97	50	511	171
Lower Kalskag	7	7	1	0	34	11	1	1	40	18	5	1	4	4	9	0	–	–	–	–	85	40	260	96
Upper Kalskag	5	4	2	1	18	3	0	0	26	13	4	2	4	4	13	0	5	4	5	2	58	28	190	82
Aniak	12	12	1	0	66	13	0	0	77	31	8	2	7	6	3	1	5	5	21	0	167	67	718	293
Chuathbaluk	3	3	0	0	6	6	1	0	21	18	3	1	1	1	9	–	1	1	31	–	32	29	100	21
Crooked Creek	5	5	0	0	10	10	0	0	15	14	2	0	–	–	–	–	3	3	25	0	33	32	110	7
Red Devil	–	–	–	–	1	0	–	–	4	4	6	0	3	3	4	0	–	–	–	–	8	7	38	0
Sleetmute	2	2	0	0	7	7	0	0	20	18	2	0	–	–	–	–	2	1	0	–	31	28	36	13
Stony River	3	1	0	–	4	3	3	2	7	5	14	6	–	–	–	–	–	–	–	–	14	9	109	100
Lime Village	–	–	–	–	2	2	0	0	3	2	0	0	1	1	18	–	1	1	15	–	7	6	33	0
McGrath	10	9	0	0	73	19	0	0	37	21	2	1	3	2	5	3	1	1	2	–	124	52	118	76
Takotna	4	4	0	0	17	16	0	0	4	4	0	0	–	–	–	–	–	–	–	–	25	24	0	0
Nikolai	1	1	0	–	19	19	2	0	10	8	11	3	–	–	–	–	1	1	30	–	31	29	177	62
Telida	–	–	–	–	–	–	–	–	2	0	–	–	–	–	–	–	–	–	–	–	2	0	–	–
Quinhagak	12	11	25	4	33	11	0	0	111	55	28	3	15	15	103	0	2	2	148	0	173	94	5,217	592
Goodnews Bay	3	3	0	0	18	6	0	0	53	25	8	2	1	1	0	–	1	1	12	–	76	36	457	214
Platinum	3	1	0	–	5	4	5	2	10	9	7	2	1	1	0	–	–	–	–	–	19	15	96	44

Note: This table depicts only the expanded harvest estimates by village. It does not include Bayesian estimates for missed villages. For full annual harvest estimate see Table 2 and Appendix A1. Dashes indicate data is unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed, SE = standard error, and CI (95%) = 95% confidence interval.

Table 4.—Expanded harvest of chum salmon for communities surveyed, Kuskokwim Area, 2017.

Community	Unknown				Not usually harvest				Light harvesters				Medium harvesters				High harvesters				Combined use groups			
	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	Total <i>N</i>	Total <i>n</i>	Est. Total	CI (95%)
Kongiganak	—	—	—	—	14	0	—	—	62	0	—	—	12	0	—	—	2	0	—	—	90	0	—	—
Tuntutuliak	10	8	3	1	33	9	3	2	43	22	18	4	21	20	52	2	4	3	34	6	111	62	2,158	373
Eek	9	9	4	0	35	11	3	1	46	23	9	2	9	8	26	3	—	—	—	—	99	51	762	209
Kasigluk	8	6	7	2	39	10	2	2	58	29	27	4	10	8	44	5	4	3	58	7	119	56	2,360	501
Nunapitchuk	8	7	17	4	34	6	10	8	56	25	32	5	14	13	104	8	9	9	143	0	121	60	5,035	839
Atmaultuak	10	10	15	0	18	6	0	0	29	13	36	6	11	11	61	0	3	3	80	0	71	43	2,090	329
Napakiak	7	7	11	0	32	10	0	0	41	18	21	7	15	14	46	3	3	3	38	0	98	52	1,726	562
Napaskiak	12	8	4	2	34	10	15	8	42	17	23	5	13	10	53	7	4	4	43	0	105	49	2,355	700
Oscarville	1	0	—	—	1	1	0	—	10	8	16	3	2	2	40	0	—	—	—	—	14	11	261	64
Bethel	—	—	—	—	—	—	—	—	1,844	489	10	1	—	—	—	—	—	—	—	—	1,844	489	17,780	3,668
Kwethluk	11	10	6	1	51	16	4	4	87	48	32	5	19	19	51	0	5	5	92	0	173	98	4,501	936
Akiachak	14	12	13	3	48	10	11	5	85	37	18	3	18	18	39	0	4	4	86	0	169	81	3,311	682
Akiak	10	7	25	8	28	7	25	16	32	16	22	4	11	10	17	2	10	8	118	28	91	48	3,026	1,114
Tuluksak	9	7	3	1	27	9	8	5	47	19	21	6	13	13	90	0	1	1	0	—	97	49	2,408	648
Lower Kalskag	7	6	2	0	34	11	1	1	40	18	19	6	4	4	51	0	—	—	—	—	85	39	1,019	514
Upper Kalskag	5	4	0	0	18	3	0	0	26	13	3	1	4	4	30	0	5	3	0	0	58	27	204	62
Aniak	12	12	7	0	66	13	0	0	77	31	8	2	7	6	15	3	5	5	165	0	167	67	1,604	237
Chuathbaluk	3	3	0	0	6	6	2	0	21	18	12	2	1	1	90	—	1	1	250	—	32	29	606	77
Crooked Creek	5	5	0	0	10	10	4	0	15	14	9	1	—	—	—	—	3	3	67	0	33	32	374	30
Red Devil	—	—	—	—	1	0	—	—	4	4	5	0	3	3	29	0	—	—	—	—	8	7	121	0
Sleetmute	2	2	0	0	7	7	0	0	20	18	7	2	—	—	—	—	2	1	0	—	31	28	147	60
Stony River	3	1	0	—	4	3	17	8	7	5	6	3	—	—	—	—	—	—	—	—	14	9	109	86
Lime Village	—	—	—	—	2	2	0	0	3	2	0	0	1	1	95	—	1	1	40	—	7	6	135	0
McGrath	10	9	0	0	73	19	0	0	37	21	3	2	3	2	0	0	1	1	20	—	124	52	145	121
Takotna	4	4	0	0	17	16	0	0	4	4	0	0	—	—	—	—	—	—	—	—	25	24	0	0
Nikolai	1	1	0	—	19	19	3	0	10	8	25	9	—	—	—	—	1	1	52	—	31	29	352	174
Telida	—	—	—	—	—	—	—	—	2	0	—	—	—	—	—	—	—	—	—	—	2	0	—	—
Quinhagak	12	11	5	1	33	11	0	0	111	56	9	1	15	15	30	0	2	2	27	0	173	95	1,592	276
Goodnews Bay	3	3	0	0	18	6	0	0	53	25	2	0	1	1	0	—	1	1	12	—	76	36	90	32
Platinum	3	1	0	—	5	4	1	0	10	9	18	2	1	1	0	—	—	—	—	—	19	15	188	45

Note: This table depicts only the expanded harvest estimates by village. It does not include Bayesian estimates for missed villages. For full annual harvest estimate see Table 2 and Appendix A2. Dashes indicate data is unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed, SE = standard error, and CI (95%) = 95% confidence interval.

Table 5.—Expanded harvest of sockeye salmon for communities surveyed, Kuskokwim Area, 2017.

Community	Unknown				Not usually harvest				Light harvesters				Medium harvesters				High harvesters				Combined use groups			
	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	Total <i>N</i>	Total <i>n</i>	Est. Total	CI (95%)
Kongiganak	–	–	–	–	14	0	–	–	62	0	–	–	12	0	–	–	2	0	–	–	90	0	–	–
Tuntutuliak	10	8	2	1	33	9	4	2	43	22	14	2	21	20	28	1	4	3	27	4	111	62	1,438	220
Eek	9	9	11	0	35	11	4	2	46	23	14	3	9	8	45	6	–	–	–	–	99	51	1,266	314
Kasigluk	8	6	4	1	39	10	1	1	58	29	18	2	10	8	34	4	4	3	62	6	119	56	1,703	297
Nunapitchuk	8	7	6	2	34	6	1	1	56	25	13	2	14	13	33	2	9	9	33	0	121	60	1,570	287
Atmaultluak	10	10	11	0	18	6	13	10	29	13	28	6	11	11	25	0	3	3	42	0	71	43	1,535	491
Napakiak	7	7	7	0	32	10	0	0	41	18	12	3	15	14	21	1	3	3	21	0	98	52	916	284
Napaskiak	12	8	4	2	34	10	6	4	42	17	16	3	13	10	27	3	4	4	35	0	105	49	1,404	391
Oscarville	1	0	–	–	1	1	0	–	10	8	18	3	2	2	29	0	–	–	–	–	14	11	260	59
Bethel	–	–	–	–	–	–	–	–	1,844	490	10	1	–	–	–	–	–	–	–	–	1,844	490	17,477	3,013
Kwethluk	11	10	2	0	51	16	4	2	87	48	24	4	19	19	33	0	5	5	63	0	173	98	3,257	766
Akiachak	14	12	9	2	48	10	11	6	85	38	20	3	18	18	36	0	4	4	85	0	169	82	3,316	743
Akiak	10	6	31	11	28	7	12	6	32	16	35	8	11	10	17	2	10	8	144	24	91	47	3,398	793
Tuluksak	9	7	3	1	27	9	3	1	47	20	14	5	13	13	37	0	1	1	0	–	97	50	1,256	496
Lower Kalskag	7	6	2	1	34	11	1	1	40	18	13	4	4	4	21	0	–	–	–	–	85	39	630	289
Upper Kalskag	5	4	0	0	18	3	0	0	26	13	11	4	4	4	54	0	5	3	0	0	58	27	509	203
Aniak	12	12	3	0	66	13	0	0	77	31	12	3	7	6	25	8	5	5	824	0	167	67	5,277	478
Chuathbaluk	3	3	0	0	6	6	8	0	21	18	19	2	1	1	80	–	1	1	100	–	32	29	631	91
Crooked Creek	5	5	6	0	10	10	3	0	15	14	19	2	–	–	–	–	3	3	52	0	33	32	508	45
Red Devil	–	–	–	–	1	0	–	–	4	4	36	0	3	3	12	0	–	–	–	–	8	7	206	0
Sleetmute	2	2	0	0	7	7	0	0	20	18	16	3	–	–	–	–	2	1	102	–	31	28	514	109
Stony River	3	1	0	–	4	3	11	5	7	5	13	3	–	–	–	–	–	–	–	–	14	9	138	67
Lime Village	–	–	–	–	2	2	0	0	3	2	0	0	1	1	75	–	1	1	250	–	7	6	325	0
McGrath	10	9	0	0	73	19	5	4	37	21	9	4	3	2	60	35	1	1	5	–	124	52	892	693
Takotna	4	4	0	0	17	16	0	0	4	4	0	0	–	–	–	–	–	–	–	–	25	24	1	1
Nikolai	1	1	0	–	19	19	0	0	10	8	0	0	–	–	–	–	1	1	34	–	31	29	35	0
Telida	–	–	–	–	–	–	–	–	2	0	–	–	–	–	–	–	–	–	–	–	2	0	–	–
Quinhagak	12	11	7	1	33	11	2	1	111	55	20	3	15	15	91	0	2	2	80	0	173	94	3,850	577
Goodnews Bay	3	3	0	0	18	6	0	0	53	25	12	2	1	1	0	–	1	1	52	–	76	36	677	261
Platinum	3	1	0	–	5	4	10	4	10	9	46	5	1	1	25	–	–	–	–	–	19	15	533	111

Note: This table depicts only the expanded harvest estimates by village. It does not include Bayesian estimates for missed villages. For full annual harvest estimate see Table 2 and Appendix A3. Dashes indicate data is unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed, SE = standard error, and CI (95%) = 95% confidence interval.

Table 6.—Expanded harvest of coho salmon for surveyed communities, Kuskokwim Area, 2017.

Community	Unknown				Not usually harvest				Light harvesters				Medium harvesters				High harvesters				Combined use groups			
	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	Total <i>N</i>	Total <i>n</i>	Est. Total	CI (95%)
Kongiganak	—	—	—	—	14	0	—	—	62	0	—	—	12	0	—	—	2	0	—	—	90	0	—	—
Tuntutuliak	10	8	0	0	33	9	1	1	43	22	2	1	21	20	14	1	4	3	14	4	111	62	472	80
Eek	9	9	7	0	35	11	6	4	46	23	8	1	9	8	19	5	—	—	—	—	99	51	797	299
Kasigluk	8	6	7	3	39	10	1	0	58	29	4	2	10	8	11	2	4	4	0	0	119	57	390	211
Nunapitchuk	8	7	14	5	34	6	2	2	56	25	11	3	14	13	19	2	9	9	5	0	121	60	1,103	327
Atmautluak	10	10	6	0	18	6	4	3	29	13	7	3	11	11	4	0	3	3	9	0	71	43	415	232
Napakiak	7	7	0	0	32	10	0	0	41	18	7	3	15	14	5	1	3	3	2	0	98	52	379	273
Napaskiak	12	8	13	6	34	10	0	0	42	17	15	4	13	10	13	2	4	4	10	0	105	49	1,011	346
Oscarville	1	0	—	—	1	1	0	—	10	8	8	2	2	2	0	0	—	—	—	—	14	11	82	40
Bethel	—	—	—	—	—	—	—	—	1,844	492	10	1	—	—	—	—	—	—	—	—	1,844	492	17,852	3,277
Kwethluk	11	10	2	0	51	16	9	6	87	48	15	3	19	19	20	0	5	5	40	0	173	98	2,361	733
Akiachak	14	12	1	0	48	10	3	2	85	38	8	1	18	18	23	0	4	4	145	0	169	82	1,771	263
Akiak	10	6	5	3	28	7	81	66	32	15	15	3	11	10	4	1	10	9	74	18	91	47	3,566	3,760
Tuluksak	9	7	1	1	27	10	5	4	47	21	8	3	13	13	12	0	1	1	0	—	97	52	668	375
Lower Kalskag	7	7	8	0	34	11	2	1	40	18	4	2	4	4	23	0	—	—	—	—	85	40	347	164
Upper Kalskag	5	4	0	0	18	3	0	0	26	13	3	1	4	4	26	0	5	4	0	0	58	28	188	68
Aniak	12	12	10	0	66	13	1	1	77	31	10	2	7	7	15	0	5	5	766	0	167	68	4,883	361
Chuathbaluk	3	3	0	0	6	6	4	0	21	18	4	1	1	1	15	—	1	1	20	—	32	29	149	32
Crooked Creek	5	5	4	0	10	10	1	0	15	14	11	1	—	—	—	—	3	3	22	0	33	32	256	35
Red Devil	—	—	—	—	1	0	—	—	4	4	4	0	3	3	26	0	—	—	—	—	8	7	106	0
Sleetmute	2	2	0	0	7	7	0	0	20	18	3	1	—	—	—	—	2	1	0	—	31	28	61	18
Stony River	3	1	0	—	4	3	3	1	7	5	11	4	—	—	—	—	—	—	—	—	14	9	86	65
Lime Village	—	—	—	—	2	2	0	0	3	2	7	1	1	1	40	—	1	1	20	—	7	6	81	8
McGrath	10	9	0	0	73	19	1	0	37	21	10	6	3	2	40	23	1	1	120	—	124	52	663	485
Takotna	4	4	0	0	17	16	0	0	4	4	0	0	—	—	—	—	—	—	—	—	25	24	0	0
Nikolai	1	1	0	—	19	19	1	0	10	8	3	1	—	—	—	—	1	1	64	—	31	29	99	23
Telida	—	—	—	—	—	—	—	—	2	0	—	—	—	—	—	—	—	—	—	—	2	0	—	—
Quinhagak	12	11	13	1	33	11	1	0	111	56	10	1	15	15	19	0	2	2	65	0	173	95	1,734	319
Goodnews Bay	3	3	0	0	18	6	0	0	53	25	5	1	1	1	0	—	1	1	7	—	76	36	289	126
Platinum	3	1	19	—	5	4	6	2	10	9	17	2	1	1	15	—	—	—	—	—	19	15	273	50

Note: This table depicts only the expanded harvest estimates by village. It does not include Bayesian estimates for missed villages. For full annual harvest estimate see Table 2 and Appendix A4. Dashes indicate data is unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed, SE = standard error, and CI (95%) = 95% confidence interval.

Table 7.—Expanded harvest of pink salmon for communities surveyed, Kuskokwim Area, 2016.

Community	Unknown				Not usually harvest				Light harvesters				Medium harvesters				High harvesters				Combined use groups			
	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	Total <i>N</i>	Total <i>n</i>	Est. Total	CI (95%)
Kongiganak	—	—	—	—	14	0	—	—	62	0	—	—	12	0	—	—	2	0	—	—	90	0	—	—
Tuntutuliak	10	8	0	0	33	9	0	0	43	22	0	0	21	20	1	0	4	3	0	0	111	62	12	3
Eek	9	9	0	0	35	11	1	0	46	23	1	1	9	8	6	2	—	—	—	—	99	51	128	76
Kasigluk	8	6	0	0	39	11	0	0	58	29	0	0	10	8	0	0	4	4	0	0	119	58	14	12
Nunapitchuk	8	7	0	0	34	6	0	0	56	26	1	0	14	13	0	0	9	9	0	0	121	61	33	22
Atmautluak	10	10	0	0	18	6	0	0	29	13	0	0	11	11	0	0	3	3	0	0	71	43	4	7
Napakiak	7	7	0	0	32	10	0	0	41	18	0	0	15	14	0	0	3	3	0	0	98	52	6	7
Napaskiak	12	8	0	0	34	10	0	0	42	18	0	0	13	10	0	0	4	4	0	0	105	50	0	0
Oscarville	1	0	—	—	1	1	0	—	10	8	1	0	2	2	1	0	—	—	—	—	14	11	6	5
Bethel	—	—	—	—	—	—	—	—	1,844	492	0	0	—	—	—	—	—	—	—	—	1,844	492	592	227
Kwethluk	11	10	0	0	51	16	1	1	87	48	1	1	19	19	0	0	5	5	0	0	173	98	133	102
Akiachak	14	12	0	0	48	10	0	0	85	38	1	0	18	18	0	0	4	4	0	0	169	82	52	51
Akiak	10	7	3	2	28	7	0	0	32	16	2	1	11	10	0	0	10	9	68	21	91	49	764	427
Tuluksak	9	7	0	0	27	10	0	0	47	21	0	0	13	13	2	0	1	1	0	—	97	52	29	10
Lower Kalskag	7	7	0	0	34	11	0	0	40	18	2	1	4	4	0	0	—	—	—	—	85	40	67	100
Upper Kalskag	5	4	0	0	18	3	0	0	26	13	0	0	4	4	5	0	5	4	0	0	58	28	20	0
Aniak	12	12	0	0	66	13	0	0	77	31	0	0	7	6	0	0	5	5	41	0	167	67	215	9
Chuathbaluk	3	3	0	0	6	6	0	0	21	18	0	0	1	1	0	—	1	1	0	—	32	29	0	0
Crooked Creek	5	5	0	0	10	10	0	0	15	14	0	0	—	—	—	—	3	3	2	0	33	32	5	0
Red Devil	—	—	—	—	1	0	—	—	4	4	1	0	3	3	2	0	—	—	—	—	8	7	9	0
Sleetmute	2	2	0	0	7	7	0	0	20	18	0	0	—	—	—	—	2	1	0	—	31	28	0	0
Stony River	3	1	0	—	4	3	0	0	7	5	0	0	—	—	—	—	—	—	—	—	14	9	0	0
Lime Village	—	—	—	—	2	2	0	0	3	2	0	0	1	1	0	—	1	1	4	—	7	6	4	0
McGrath	10	9	0	0	73	19	0	0	37	21	0	0	3	2	0	0	1	1	0	—	124	52	4	7
Takotna	4	4	0	0	17	16	0	0	4	4	0	0	—	—	—	—	—	—	—	—	25	24	0	0
Nikolai	1	1	0	—	19	19	0	0	10	8	0	0	—	—	—	—	1	1	1	—	31	29	1	0
Telida	—	—	—	—	—	—	—	—	2	0	—	—	—	—	—	—	—	—	—	—	2	0	—	—
Quinhagak	12	11	1	0	33	11	0	0	111	56	1	0	15	15	0	0	2	2	2	0	173	95	140	94
Goodnews Bay	3	3	0	0	18	6	0	0	53	26	0	0	1	1	0	—	1	1	0	—	76	37	6	6
Platinum	3	0	—	—	5	4	1	0	10	9	4	1	1	1	0	—	—	—	—	—	19	14	48	19

Note: This table depicts only the expanded harvest estimates by village. Bayesian estimates are not performed for pink salmon for missed villages. Dashes indicate data is unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed, SE = standard error, and CI (95%) = 95% confidence interval.

Table 8.—Total estimated subsistence salmon harvest by species and community for the Kuskokwim Area, 2017.

Community	Households (HH)			Chinook			Chum			Sockeye			Coho			Pink		
	Total	Total	%	Avg.	Est.	CI												
	<i>N</i>	<i>n</i>	survey	harvest/ HH	Total harvest	(95%)												
Kongiganak ^a	90	0	0%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
N. Kuskokwim Bay	90	0	0%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tuntutuliak	111	61	55%	13	1,459	224	19	2,158	373	13	1,438	220	4	472	80	0	12	3
Eek	99	49	49%	8	825	264	8	762	209	13	1,266	314	8	797	299	1	128	76
Kasigluk	119	61	51%	7	791	172	20	2,360	501	14	1,703	297	3	390	211	0	14	12
Nunapitchuk	121	69	57%	6	761	391	42	5,035	839	13	1,570	287	9	1,103	327	0	33	22
Atmaultluak	71	44	62%	3	195	56	29	2,090	329	22	1,535	491	6	415	232	0	4	7
Napakiak	98	47	48%	5	505	191	18	1,726	562	9	916	284	4	379	273	0	6	7
Napaskiak	105	55	52%	8	858	342	22	2,355	700	13	1,404	391	10	1,011	346	0	0	0
Oscarville	14	13	93%	9	122	56	19	261	64	19	260	59	6	82	40	0	6	5
Bethel	1,844	413	22%	3	5,336	1,154	10	17,780	3,668	9	17,477	3,013	10	17,852	3,277	0	592	227
Kwethluk	173	96	55%	6	1,019	151	26	4,501	936	19	3,257	766	14	2,361	733	1	133	102
Akiachak	169	83	49%	8	1,415	353	20	3,311	682	20	3,316	743	10	1,771	263	0	52	51
Akiak	91	45	49%	8	694	166	33	3,026	1,114	37	3,398	793	39	3,566	3,760	8	764	427
Tuluksak	97	52	54%	5	511	171	25	2,408	648	13	1,256	496	7	668	375	0	29	10
Lower Kuskokwim	3,112	1,088	35%	5	14,491	1,403	15	47,773	4,275	12	38,796	3,428	10	30,867	5,036	1	1,773	494
Lower Kalskag	85	36	42%	3	260	96	12	1,019	514	7	630	289	4	347	164	1	67	100
Upper Kalskag	58	26	45%	3	190	82	4	204	62	9	509	203	3	188	68	0	20	0
Aniak	167	67	40%	4	718	293	10	1,604	237	32	5,277	478	29	4,883	361	1	215	9
Chuathbaluk	32	27	84%	3	100	21	19	606	77	20	631	91	5	149	32	0	0	0
Middle Kuskokwim	342	156	46%	4	1,268	316	10	3,433	562	21	7,047	591	16	5,567	398	1	301	98
Crooked Creek	33	32	97%	3	110	7	11	374	30	15	508	45	8	256	35	0	5	0
Red Devil	8	7	88%	5	38	0	15	121	0	26	206	0	13	106	0	1	9	0
Sleetmute	31	27	87%	1	36	13	5	147	60	17	514	109	2	61	18	0	0	0
Stony River	14	11	79%	8	109	100	8	109	86	10	138	67	6	86	65	0	0	0
Lime Village	7	6	0%	5	33	0	19	135	0	46	325	0	12	81	8	1	4	0
McGrath	124	53	43%	1	118	76	1	145	121	7	892	693	5	663	485	0	4	7
Takotna	25	25	100%	0	0	0	0	0	0	0	1	1	0	0	0	—	0	0
Nikolai	31	29	94%	6	177	62	11	352	174	1	35	0	3	99	23	0	1	0
Telida ^a	2	—	0%	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Upper Kuskokwim	275	190	69%	2	621	130	5	1,383	228	10	2,619	694	5	1,352	482	0	23	7
Kuskokwim R. Total	3,819	1,434	38%	4	16,380	1,443	14	52,589	4,316	13	48,462	3,545	10	37,786	5,073	1	2,097	504

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Table 8.–Page 2 of 2.

Community	Households (HH)			Chinook			Chum			Sockeye			Coho			Pink		
	Total <i>N</i>	Total <i>n</i>	% survey	Avg. harvest/ HH	Est. Total harvest	CI (95%)												
Quinhagak	76	91	120%	69	5,217	592	21	1,592	276	51	3,850	577	23	1,734	319	2	140	94
Goodnews Bay	19	37	195%	24	457	214	5	90	32	36	677	261	15	289	126	0	6	6
Platinum	268	18	7%	0	96	44	1	188	45	2	533	111	1	273	50	0	48	19
S. Kuskokwim Bay	363	146	40%	16	5,770	627	5	1,870	280	14	5,060	636	6	2,296	343	1	194	95
Total	4,182	1,580	38%	5	22,150	1,571	13	54,459	4,324	13	53,522	3,601	10	40,082	5,084	1	2,291	513

Note: Dashes indicate data are unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed, and CI (95%) = 95% confidence interval.

Table 9.—Estimated number of salmon retained from commercial fishing for subsistence use, Kuskokwim Area, 2017.

Community	N	n	Chinook		Chum		Sockeye		Coho		Pink	
			Estimated retained	95% CI								
Kongiganak	90	—	—	—	—	—	—	—	—	—	—	—
N. Kuskokwim Bay	90	—	—	—	—	—	—	—	—	—	—	—
Tuntutuliak	111	61	0	0	0	0	0	0	0	0	0	0
Eek	99	49	0	0	0	0	0	0	0	0	0	0
Kasigluk	118	61	0	0	0	0	0	0	0	0	0	0
Nunapitchuk	120	69	0	0	0	0	0	0	0	0	0	0
Atmaultluak	71	44	0	0	0	0	0	0	0	0	0	0
Napakiak	98	47	0	0	0	0	0	0	0	0	0	0
Napaskiak	105	55	0	0	0	0	0	0	0	0	0	0
Oscarville	14	13	0	0	0	0	0	0	0	0	0	0
Bethel	1,844	413	0	0	0	0	0	0	0	0	0	0
Kwethluk	173	96	0	0	0	0	0	0	0	0	0	0
Akiachak	169	83	0	0	0	0	0	0	0	0	0	0
Akiak	91	45	0	0	0	0	0	0	0	0	0	0
Tuluksak	97	52	0	0	0	0	0	0	0	0	0	0
Lower Kuskokwim	3,110	1088	0	0	0	0	0	0	0	0	0	0
Lower Kalskag	85	36	0	0	0	0	0	0	0	0	0	0
Upper Kalskag	58	26	0	0	0	0	0	0	0	0	0	0
Aniak	167	67	0	0	0	0	0	0	0	0	0	0
Chuathbaluk	32	27	0	0	0	0	0	0	0	0	0	0
Middle Kuskokwim	342	156	0	0	0	0	0	0	0	0	0	0
Crooked Creek	33	32	0	0	0	0	0	0	0	0	0	0
Red Devil	8	7	0	0	0	0	0	0	0	0	0	0
Sleetmute	31	27	0	0	0	0	0	0	0	0	0	0
Stony River	14	11	0	0	0	0	0	0	0	0	0	0
Lime Village	7	6	0	0	0	0	0	0	0	0	0	0
McGrath	124	53	0	0	0	0	0	0	0	0	0	0
Takotna	25	25	0	0	0	0	0	0	0	0	0	0
Nikolai	31	29	0	0	0	0	0	0	0	0	0	0
Telida	2	—	—	—	—	—	—	—	—	—	—	—
Upper Kuskokwim	275	190	0	0	0	0	0	0	0	0	0	0
Kuskokwim R.Total	3,727	1434	0	0	0	0	0	0	0	0	0	0

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Table 9.–Page 2 of 2.

Community	<i>N</i>	<i>n</i>	Chinook		Chum		Sockeye		Coho		Pink	
			Estimated retained	95% CI								
Quinhagak	173	91	0	0	0	0	0	0	0	0	0	0
Goodnews	76	37	0	0	0	0	0	0	0	0	0	0
Platinum	19	18	0	0	0	0	0	0	0	0	0	0
S. Kuskokwim Bay	268	146	0	0	0	0	0	0	0	0	0	0
Survey Total	4085	0	0	0	0	0	0	0	0	0	0	0

Note: Dashes indicate data are unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed.

Table 10.–Fishing gear reported as the primary type used by subsistence fishermen, Kuskokwim Area, 2017.

Community	<i>N</i>	<i>n</i>	Set net	Drift net	Fish wheel	Hook & line	Dip net	Other
Kongiganak	90	0	–	–	–	–	–	–
N. Kuskokwim Bay	90	0	–	–	–	–	–	–
Tuntutuliak	111	64	26	48	0	0	0	0
Eek	99	51	7	49	0	6	0	0
Kasigluk	119	62	0	73	0	0	0	0
Nunapitchuk	121	70	1	77	0	0	0	0
Atmautluak	71	44	0	44	0	0	0	0
Napakiaik	98	52	0	44	0	0	1	0
Napaskiak	105	58	1	58	0	0	0	0
Oscarville	14	13	2	9	0	0	0	0
Bethel	1844	560	53	634	3	73	3	0
Kwethluk	173	98	9	80	0	2	0	0
Akiachak	169	90	6	92	0	0	0	0
Akiak	91	50	9	58	0	0	0	0
Tuluksak	97	54	0	55	0	2	0	0
Lower Kuskokwim	3,112	1,266	116	1,321	3	84	4	0
Lower Kalskag	85	40	0	35	11	0	0	0
Upper Kalskag	58	30	4	14	0	0	0	2
Aniak	167	72	5	42	4	27	0	0
Chuathbaluk	32	29	0	16	4	1	0	0
Middle Kuskokwim	342	171	9	107	20	29	0	2
Crooked Creek	33	32	0	14	6	0	0	0
Red Devil	8	7	2	5	0	0	0	0
Sleetmute	31	29	2	8	4	0	0	0
Stony River	14	12	4	2	0	1	0	0
Lime Village	7	6	4	0	0	2	0	0
McGrath	124	54	6	8	23	7	0	0
Takotna	25	25	0	0	0	1	0	0
Nikolai	31	29	1	0	8	7	0	0
Telida	2	0	–	–	–	–	–	–
Upper Kuskokwim	273	194	18	37	41	18	0	0
Kuskokwim River Total	3,817	1,631	143	1,465	64	131	4	2
Quinhagak	173	95	5	88	0	30	0	0
Goodnews	76	37	8	18	0	13	0	0
Platinum	19	18	3	4	0	6	0	0
S. Kuskokwim Bay	268	150	16	111	0	49	0	0
Total	3,995	1,781	159	1,576	64	179	4	2

Note: Dashes indicate data are unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed.

Table 11.—Estimated number of households that subsistence fished in communities surveyed, Kuskokwim Area, 2017.

Community	Unknown				Not usually harvest				Light harvesters				Medium harvesters				High harvesters				Combined use groups			
	N	n	Mean	SE	N	n	Mean	SE	N	n	Mean	SE	N	n	Mean	SE	N	n	Mean	SE	Total N	Total n	Est. Total	CI (95%)
Kongiganak	—	—	—	—	14	0	—	—	62	0	—	—	12	0	—	—	2	0	—	—	90	0	—	—
N. Kuskokwim Bay	—	—	—	—	14	0	—	—	62	0	—	—	12	0	—	—	2	0	—	—	90	0	—	—
Tuntutuliak	10	9	0	0	33	10	0	0	43	22	1	0	21	20	1	0	4	3	1	0	111	64	74	10
Eek	9	9	0	0	35	11	1	0	46	23	1	0	9	8	1	0	—	—	—	—	99	51	63	11
Kasigluk	8	8	1	0	39	11	0	0	58	30	1	0	10	9	1	0	4	4	1	0	119	62	73	12
Nunapitchuk	8	7	0	0	34	10	0	0	56	31	1	0	14	13	1	0	9	9	1	0	121	70	78	11
Atmautluak	10	10	1	0	18	6	0	0	29	14	1	0	11	11	1	0	3	3	1	0	71	44	44	8
Napakiak	7	7	0	0	32	10	0	0	41	18	1	0	15	14	1	0	3	3	1	0	98	52	45	7
Napaskiak	12	12	0	0	34	11	0	0	42	20	1	0	13	11	1	0	4	4	1	0	105	58	59	10
Oscarville	1	1	0	0	1	1	1	0	10	9	1	0	2	2	1	—	—	—	—	14	13	11	1	
Bethel	—	—	—	—	—	—	—	—	1844	560	0	0	—	—	—	—	—	—	—	—	1,844	560	767	63
Kwethluk	11	10	1	0	51	16	0	0	87	48	1	0	19	19	1	0	5	5	1	0	173	98	91	12
Akiachak	14	12	1	0	48	14	0	0	85	42	1	0	18	18	1	0	4	4	1	0	169	90	98	13
Akiak	10	8	1	0	28	7	1	0	32	16	1	0	11	10	1	0	10	9	1	0	91	50	67	11
Tuluksak	9	8	1	0	27	10	0	0	47	22	1	0	13	13	1	0	1	1	0	0	97	54	57	10
Lower Kuskokwim	109	101	1	0	380	117	0	0	2,420	855	1	0	156	148	1	0	47	45	1	0	3,112	1,266	1,528	72
Lower Kalskag	7	7	1	0	34	11	0	0	40	18	1	0	4	4	1	0	—	—	—	—	85	40	47	11
Upper Kalskag	5	5	0	0	18	3	0	0	26	14	1	0	4	4	1	0	5	4	0	0	58	30	19	5
Aniak	12	12	1	0	66	15	0	0	77	33	1	0	7	7	1	0	5	5	1	0	167	72	80	12
Chuathbaluk	3	3	0	0	6	6	1	0	21	18	1	0	1	1	1	0	1	1	1	0	32	29	21	2
Middle Kuskokwim	27	27	1	0	124	35	0	0	164	83	1	0	16	16	1	0	11	10	1	0	342	171	167	17
Crooked Creek	5	5	0	0	10	10	0	0	15	14	1	0	—	—	—	—	3	3	1	0	33	32	20	1
Red Devil	—	—	—	—	1	0	—	—	4	4	1	0	3	3	1	0	—	—	—	—	8	7	7	0
Sleetmute	2	2	0	—	7	7	0	0	20	19	1	0	—	—	—	—	2	1	1	0	31	29	15	1
Stony River	3	3	0	0	4	3	1	0	7	6	1	0	—	—	—	—	—	—	—	—	14	12	7	2
Lime Village	—	—	—	—	2	2	0	—	3	2	1	—	1	1	1	0	1	1	1	0	7	6	5	0
McGrath	10	9	0	0	73	20	0	0	37	21	0	0	3	3	1	0	1	1	1	0	124	54	44	14
Takotna	4	4	0	0	17	17	0	0	4	4	0	0	—	—	—	—	—	—	—	—	25	25	1	0
Nikolai	1	1	0	0	19	19	0	0	10	8	1	0	—	—	—	—	1	1	1	0	31	29	15	2
Telida	—	—	—	—	—	—	—	—	2	0	—	—	—	—	—	—	—	—	—	—	2	0	—	—
Upper Kuskokwim	25	24	0	0	133	78	0	0	102	78	1	0	7	7	1	0	8	7	1	0	275	194	114	14
Kuskokwim R. Total	161	152	1	0	637	230	0	0	2,686	1,016	1	0	179	171	1	0	66	62	1	0	3,729	1,631	1,809	75

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Table 11.–Page 2 of 2.

Community	Unknown				Not usually harvest				Light harvesters				Medium harvesters				High harvesters				Combined use groups			
	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	Total <i>N</i>	Total <i>n</i>	Est. Total	CI (95%)
Quinhagak	12	11	1	0	33	11	0	0	111	56	1	0	15	15	1	0	2	2	1	–	173	95	123	12
Goodnews Bay	3	3	0	0	18	6	0	0	53	26	1	0	1	1	0	0	1	1	1	0	76	37	40	7
Platinum	3	3	0	0	5	4	1	0	10	10	1	0	1	1	1	0	–	–	–	–	19	18	14	1
S. Kuskokwim Bay	18	17	1	0	56	21	0	0	174	92	1	0	17	17	1	0	3	3	1	0	268	150	176	14
Total	179	169	1	0	707	251	0	0	2,922	1,108	1	0	208	188	1	0	71	65	1	0	4,087	1,781	1,985	76

Note: Dashes indicate data are unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed, SE = standard error, Est. Total = estimated total number of households from all use groups that subsistence fished, expressed as a proportion of households from each group that fished, based on the number of households surveyed, and their responses to the question: "Did you subsistence fish?", CI (95%) = 95% confidence interval.

Table 12.—Estimated number of people living in communities surveyed, Kuskokwim Area, 2017.

Community	Unknown				Not Usually Harvest				Light Harvesters				Medium Harvesters				High Harvesters				Combined use groups			
	N	n	Mean	SE	N	n	Mean	SE	N	n	Mean	SE	N	n	Mean	SE	N	n	Mean	SE	Total N	Total n	Est. Total	CI (95%)
Kongiganak	—	—	—	—	14	0	—	—	62	0	—	—	12	0	—	—	2	0	—	—	90	0	—	—
N. Kuskokwim Bay	—	—	—	—	14	0	—	—	62	0	—	—	12	0	—	—	2	0	—	—	90	0	—	—
Tuntutuliak	10	9	3	0	33	10	4	1	43	20	4	0	21	18	5	0	4	3	4	1	111	60	463	68
Eek	9	9	2	0	35	11	2	0	46	22	5	0	9	7	7	1	—	—	—	—	99	49	379	45
Kasigluk	8	8	3	0	39	11	5	1	58	29	6	0	10	8	6	0	4	4	8	0	119	60	646	64
Nunapitchuk	8	6	6	1	34	10	4	1	56	30	5	0	14	13	5	0	9	9	9	0	121	68	638	63
Atmaultluk	10	10	5	0	18	6	3	0	29	13	6	1	11	11	6	0	3	3	6	0	71	43	363	35
Napakiak	7	6	3	0	32	7	4	1	41	18	3	1	15	14	4	0	3	2	6	0	98	47	317	70
Napaskiak	12	11	3	0	34	11	4	1	42	20	4	1	13	10	6	1	4	2	5	0	105	54	432	71
Oscarville	1	1	1	—	1	1	3	—	10	9	3	0	2	2	4	0	—	—	—	—	14	13	45	4
Bethel	—	—	—	—	—	—	—	—	1,844	545	3	0	—	—	—	—	—	—	—	—	1,844	545	6002	281
Kwethluk	11	9	3	0	51	16	4	1	87	47	5	0	19	19	6	0	5	5	4	0	173	96	793	70
Akiachak	14	11	4	0	48	13	3	0	85	38	4	0	18	17	5	0	4	3	5	1	169	82	679	58
Akiak	10	8	4	1	28	6	3	1	32	15	4	0	11	7	5	0	10	9	7	0	91	45	381	48
Tuluksak	9	8	3	0	27	9	5	1	47	21	5	0	13	13	8	0	1	1	1	—	97	52	488	55
Lower Kuskokwim	109	96	4	0	380	111	4	0	2,420	827	4	0	156	139	6	0	47	41	6	0	3,112	1,214	11,627	342
Lower Kalskag	7	6	5	0	34	9	4	0	40	17	4	0	4	4	3	0	—	—	—	—	85	36	329	47
Upper Kalskag	5	5	5	0	18	3	2	1	26	13	4	0	4	3	6	1	5	2	8	1	58	26	222	33
Aniak	12	11	2	0	66	14	3	0	77	32	4	0	7	5	4	0	5	5	4	0	167	67	571	61
Chuathbaluk	3	3	3	0	6	5	3	0	21	17	4	0	1	1	2	—	1	1	5	—	32	27	111	12
Middle Kuskokwim	27	25	4	0	124	31	3	0	164	79	4	0	16	13	4	0	11	8	6	0	342	156	1,233	83
Crooked Creek	5	5	3	0	10	10	2	0	15	14	3	0	—	—	—	—	3	3	6	0	33	32	97	4
Red Devil	—	—	—	—	1	0	—	—	4	4	3	0	3	3	1	0	—	—	—	—	8	7	19	0
Sleetmute	2	1	1	—	7	6	2	0	20	19	3	0	—	—	—	—	2	1	1	—	31	27	82	5
Stony River	3	2	1	0	4	3	5	0	7	6	3	0	—	—	—	—	—	—	—	—	14	11	40	5
Lime Village	—	—	—	—	2	2	2	0	3	2	1	0	1	1	1	—	1	1	2	—	7	6	10	0
McGrath	10	8	2	0	73	20	3	0	37	20	2	0	3	3	4	0	1	1	3	—	124	52	301	44
Takotna	4	4	3	0	17	17	2	0	4	4	2	0	—	—	—	—	—	—	—	—	25	25	57	0
Nikolai	1	1	1	—	19	19	2	0	10	7	3	0	—	—	—	—	1	1	2	—	31	28	75	8
Telida	—	—	—	—	—	—	—	—	2	0	—	—	—	—	—	—	—	—	—	—	2	0	—	—
Upper Kuskokwim	25	21	2	0	133	77	2	0	102	76	3	0	7	7	2	0	8	7	3	0	275	188	682	44
Kuskokwim R. Total	161	142	3	0	637	219	3	0	2,686	982	4	0	179	159	5	0	66	56	6	0	3,729	1,558	13,543	354

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Table 12.–Page 2 of 2.

Community	Unknown				Not Usually Harvest				Light Harvesters				Medium Harvesters				High Harvesters				Combined use groups			
	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	<i>N</i>	<i>n</i>	Mean	SE	Total <i>N</i>	Total <i>n</i>	Est. Total	CI (95%)
Quinhagak	12	11	4	0	33	9	2	0	111	55	5	0	15	15	5	0	2	2	5	0	173	92	723	54
Goodnews Bay	3	3	2	0	18	6	3	1	53	26	4	0	1	1	9	–	1	1	7	–	76	37	309	43
Platinum	3	3	2	0	5	3	2	0	10	10	3	0	1	1	6	–	–	–	–	–	19	17	44	4
S. Kuskokwim Bay	18	17	3	0	56	18	2	0	174	91	5	0	17	17	6	0	3	3	6	0	268	146	1,076	68
Survey Total	179	159	3	0	707	237	3	0	2,922	1,073	4	0	208	176	5	0	71	59	6	0	4,087	1,704	14,618	361

Note: Dashes indicate data are unavailable. Headings defined as *N* = the total number of households, *n* = the number of households surveyed, SE = standard error, Est. Total = estimated total number of households from all use groups that subsistence fished, expressed as a proportion of households from each group that fished, based on the number of households surveyed, and their responses to the question: “Did you subsistence fish?” CI (95%) = 95% confidence interval.

Table 13.—Number of fish reported as received from subsistence fisheries, Kuskokwim Area, 2017.

Community	N	Chinook			Chum			Sockeye			Coho			Pink		
		n	Est.	CI (95%)	n	Est.	CI (95%)	n	Est.	CI (95%)	n	Est.	CI (95%)	n	Est.	CI (95%)
Kongiganak	90	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–
N. Kuskokwim Bay	90	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–
Tuntutuliak	111	62	82	35	61	57	56	60	66	42	62	133	70	64	0	0
Eek	99	48	28	18	48	49	31	48	76	36	49	152	137	51	0	0
Kasigluk	119	61	113	69	61	477	202	61	597	447	60	186	199	62	0	0
Nunapitchuk	121	68	46	12	68	211	88	67	220	91	67	66	25	70	0	0
Atmaultuak	71	39	39	20	39	108	56	38	87	44	38	7	4	44	0	0
Napakiak	98	51	92	76	50	164	107	51	145	67	51	140	83	52	0	0
Napaskiak	105	56	6	3	56	113	107	56	65	76	57	86	57	58	0	0
Oscarville	14	13	7	0	12	17	8	13	30	13	13	15	6	13	0	0
Bethel	1,844	547	981	263	541	2,008	754	542	2,164	546	544	2,200	564	560	0	0
Kwethluk	173	95	44	27	94	435	217	95	180	89	95	161	57	98	0	0
Akiachak	169	87	54	30	86	225	83	85	346	240	87	192	116	90	0	0
Akiak	91	50	31	19	50	73	59	49	80	85	50	69	72	50	0	0
Tuluksak	97	52	12	9	51	40	19	53	31	22	53	32	34	54	0	0
Lower Kuskokwim	3,112	1,229	1,534	288	1,217	3,976	836	1,218	4,087	764	1,226	3,438	641	1,266	0	0
Lower Kalskag	85	38	52	37	38	280	414	38	85	85	39	77	74	40	0	0
Upper Kalskag	58	30	30	14	30	96	103	30	35	31	30	39	31	30	0	0
Aniak	167	72	90	55	71	43	4	71	316	327	72	402	277	72	0	0
Chuathbaluk	32	28	1	1	29	5	0	28	9	4	29	56	5	29	0	0
Middle Kuskokwim	342	168	173	67	168	424	416	167	445	336	170	574	285	171	0	0
Crooked Creek	33	31	11	3	31	11	7	31	23	11	31	6	0	32	0	0
Red Devil	8	6	0	0	6	0	0	7	27	0	6	0	0	7	0	0
Sleetmute	31	29	1	0	29	34	10	27	129	31	29	11	2	29	0	0
Stony River	14	12	21	16	12	0	0	12	13	9	11	5	6	12	0	0
Lime Village	7	6	0	0	6	1	0	6	43	4	6	0	0	6	0	0
McGrath	124	52	45	38	53	88	116	52	9	10	53	20	13	54	0	0
Takotna	25	24	1	1	25	0	0	22	4	2	25	1	0	25	0	0
Nikolai	31	29	97	24	29	8	6	29	14	11	28	2	2	29	0	0
Telida	2	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–
Upper Kuskokwim	275	189	176	47	191	141	115	186	263	36	189	46	14	194	0	0
Kuskokwim R. Total	3,819	1,586	1,883	402	1,576	4,541	1,367	1,571	4,795	1,136	1,585	4,058	940	1,631	0	0

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Table 13.–Page 2 of 2.

Community	N	Chinook			Chum			Sockeye			Coho			Pink		
		n	Est. CI (95%)		n	Est. CI (95%)		n	Est. CI (95%)		n	Est. CI (95%)		n	Est. CI (95%)	
Quinhagak	173	93	144	68	92	70	38	93	249	98	92	240	127	95	0	0
Goodnews Bay	76	32	16	16	32	9	11	33	163	142	34	58	42	37	0	0
Platinum	19	18	7	0	18	1	0	18	20	7	18	25	9	18	0	0
S. Kuskokwim Bay	268	143	167	70	142	81	40	144	432	169	144	323	133	150	0	0
Survey Total	4,087	1,729	2,050	307	1,718	4,622	940	1,715	5,227	851	1,729	4,381	713	1,781	0	0

Note: Dashes indicate data are unavailable. Headings are defined as follows: N = the total number of households, n = the number of households surveyed, and CI (95%) = 95% confidence interval.

Table 14.—Number of fish reported as received from commercial fisheries, Kuskokwim Area, 2017.

Community	N	Chinook			Chum			Sockeye			Coho			Pink		
		n	Est.	CI (95%)	n	Est.	CI (95%)	n	Est.	CI (95%)	n	Est.	CI (95%)	n	Est.	CI (95%)
Kongiganak	90	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–
N. Kuskokwim Bay	90	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–
Tuntutuliak	111	64	0	0	64	0	0	64	0	0	64	0	0	64	0	0
Eek	99	51	0	0	51	0	0	51	0	0	51	0	0	51	0	0
Kasigluk	119	62	0	0	62	0	0	62	0	0	62	0	0	62	0	0
Nunapitchuk	121	70	0	0	70	0	0	70	0	0	70	0	0	70	0	0
Atmautluak	71	44	0	0	44	0	0	44	0	0	44	0	0	44	0	0
Napakiak	98	52	0	0	52	0	0	52	0	0	52	0	0	52	0	0
Napaskiak	105	58	0	0	58	0	0	58	0	0	58	0	0	58	0	0
Oscarville	14	13	0	0	13	0	0	13	0	0	13	0	0	13	0	0
Bethel	1,844	560	0	0	560	0	0	560	0	0	560	0	0	560	0	0
Kwethluk	173	98	0	0	98	0	0	98	0	0	98	0	0	98	0	0
Akiachak	169	90	0	0	90	0	0	90	0	0	90	0	0	90	0	0
Akiak	91	50	0	0	50	0	0	50	0	0	50	0	0	50	0	0
Tuluksak	97	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0
Lower Kuskokwim	3,112	1,266	0	0	1,266	0	0	1,266	0	0	1,266	0	0	1,266	0	0
Lower Kalskag	85	40	0	0	40	0	0	40	0	0	40	0	0	40	0	0
Upper Kalskag	58	30	0	0	30	0	0	30	0	0	30	0	0	30	0	0
Aniak	167	72	0	0	72	0	0	72	0	0	72	0	0	72	0	0
Chuathbaluk	32	29	0	0	29	0	0	29	0	0	29	0	0	29	0	0
Middle Kuskokwim	342	171	0	0	171	0	0	171	0	0	171	0	0	171	0	0
Crooked Creek	33	32	0	0	32	0	0	32	0	0	32	0	0	32	0	0
Red Devil	8	7	0	0	7	0	0	7	0	0	7	0	0	7	0	0
Sleetmute	31	29	0	0	29	0	0	29	0	0	29	0	0	29	0	0
Stony River	14	12	0	0	12	0	0	12	0	0	12	0	0	12	0	0
Lime Village	7	6	0	0	6	0	0	6	0	0	6	0	0	6	0	0
McGrath	124	54	0	0	54	0	0	54	0	0	54	0	0	54	0	0
Takotna	25	25	0	0	25	0	0	25	0	0	25	0	0	25	0	0
Nikolai	31	29	0	0	29	0	0	29	0	0	29	0	0	29	0	0
Telida	2	0	–	–	0	–	–	0	–	–	0	–	–	0	–	–
Upper Kuskokwim	275	194	0	0	194	0	0	194	0	0	194	0	0	194	0	0
Kuskokwim R. Total	3,819	1,631	0	0	1,631	0	0	1,631	0	0	1,631	0	0	1,631	0	0

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Table 14.–Page 2 of 2.

Community	N	Chinook			Chum			Sockeye			Coho			Pink		
		n	Est.	CI (95%)	n	Est.	CI (95%)	n	Est.	CI (95%)	n	Est.	CI (95%)	n	Est.	CI (95%)
Quinhagak	173	95	0	0	95	0	0	95	0	0	95	0	0	95	0	0
Goodnews Bay	76	37	0	0	37	0	0	37	0	0	37	0	0	37	0	0
Platinum	19	18	0	0	18	0	0	18	0	0	18	0	0	18	0	0
S. Kuskokwim Bay	268	150	0	0	150	0	0	150	0	0	150	0	0	150	0	0
Survey Total	4,087	1,781	0	0	1,805	0	0	1,781	0	0	1,781	0	0	1,781	0	0

Note: Dashes indicate data are unavailable. Headings are defined as follows: N = the total number of households, n = the number of households surveyed, CI (95%) = 95% confidence interval.

Table 15.—Number of people that own dogs, number reporting harvesting salmon for dogs, and number of salmon harvested for dogs, by species, Kuskokwim Area, 2017.

Community	Own dog	Feed salmon	No. of Dogs ^a	Chinook	Chum	Sockeye	Coho	Pink
Kongiganak	—	—	—	—	—	—	—	—
N. Kuskokwim Bay	—	—	—	—	—	—	—	—
Tuntutuliak	86	0	181	0	0	0	0	0
Eek	63	3	132	0	90	68	90	182
Kasigluk	87	2	228	0	67	67	0	0
Nunapitchuk	87	4	171	0	35	0	0	0
Atmautluak	56	2	208	0	0	232	0	0
Napakiak	74	0	124	0	0	0	0	0
Napaskiak	52	2	105	0	0	0	0	0
Oscarville	5	0	24	0	0	0	0	0
Bethel	842	13	1,480	0	735	0	0	8
Kwethluk	128	2	298	0	0	0	256	0
Akiachak	87	4	242	6	410	310	820	10
Akiak	61	10	256	0	2,149	1,066	5,102	1,828
Tuluksak	67	3	185	0	175	0	18	0
Lower Kuskokwim	1,696	46	3,635	6	3,661	1,743	6,285	2,028
Lower Kalskag	72	1	176	0	180	0	0	0
Upper Kalskag	44	5	125	60	176	100	100	40
Aniak	102	5	293	0	1,345	5,567	5,283	342
Chuathbaluk	24	0	51	0	0	0	0	0
Middle Kuskokwim	242	12	645	60	1,701	5,667	5,383	382
Crooked Creek	25	1	48	0	225	0	54	15
Red Devil	6	1	10	0	17	0	0	0
Sleetmute	21	0	34	0	0	0	0	0
Stony River	5	0	6	0	0	0	0	0
Lime Village	1	1	2	0	95	0	0	0
McGrath	66	3	152	0	113	0	407	0
Takotna	12	0	26	0	0	0	0	0
Nikolai	21	4	67	66	654	30	55	1
Telida	—	—	—	—	—	—	—	—
Upper Kuskokwim	157	10	345	66	1,104	30	516	16
Kuskokwim River Total	2,095	68	4,625	132	6,466	7,439	12,184	2,426
Quinhagak	112	3	214	11	19	38	91	0
Goodnews Bay	36	0	62	0	0	0	0	0
Platinum	10	1	16	0	8	5	0	0
S. Kuskokwim Bay	158	4	292	11	27	43	91	0
Survey Total	2,253	72	4,917	143	6,493	7,482	12,275	2,426

Note: Dashes indicate data are unavailable.

^a Number of dogs reported/owned by the respondent.

Table 16.—Number of salmon, by species reported as lost due to spoilage, animals, or other reasons, Kuskokwim Area, 2017.

Community	N	Households reporting lost						Total salmon (n)	Reason given for loss						
		n	fish	Chinook	Chum	Sockeye	Coho		Animal	Disease	Equipment	Mngmt	Personal	River cond.	Weather
Kongiganak	90	—	—	—	—	—	—	—	—	—	—	—	—	—	—
N. Kuskokwim Bay	90	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Tuntutuliak	111	64	18	101	290	87	26	504	1	0	0	0	0	0	12
Eek	99	51	3	10	36	30	0	76	0	0	1	0	0	0	1
Kasigluk	119	62	24	77	379	146	0	602	0	0	0	0	0	0	13
Nunapitchuk	121	69	20	16	269	56	8	349	0	0	0	1	0	0	11
Atmaultluak	71	44	10	11	133	24	23	191	0	0	0	0	0	0	7
Napakiak	98	52	10	5	159	24	9	197	0	0	0	0	0	0	6
Napaskiak	105	58	16	12	109	77	40	238	0	0	0	0	0	0	10
Oscarville	14	13	6	10	36	15	0	61	1	0	0	0	1	0	4
Bethel	1,844	559	148	292	1,254	814	273	2,633	2	2	0	1	1	0	38
Kwethluk	173	98	37	27	613	284	23	947	2	0	0	—	0	0	22
Akiachak	169	89	38	304	424	323	35	1,086	3	0	0	1	0	0	17
Akiak	91	49	14	27	70	167	80	344	0	0	0	0	0	0	7
Tuluksak	97	54	19	63	326	108	38	535	1	1	0	0	0	0	9
Lower Kuskokwim	3,112	1,262	363	954	4,098	2,154	555	7,761	10	3	1	3	2	0	157
Lower Kalskag	85	40	2	0	13	13	0	26	0	0	0	0	0	0	1
Upper Kalskag	58	30	4	9	0	0	22	31	0	1	0	0	0	0	1
Aniak	167	71	10	0	44	12	9	65	0	3	0	0	0	0	3
Chuathbaluk	32	29	2	0	0	36	0	36	0	1	0	0	0	0	1
Middle Kuskokwim	342	170	18	9	57	62	32	160	0	5	0	0	0	0	6
Crooked Creek	33	32	5	3	18	30	0	51	1	2	0	0	0	0	2
Red Devil	8	7	0	0	0	0	0	0	—	—	—	—	—	—	—
Sleetmute	31	29	0	0	0	0	0	0	—	—	—	—	—	—	—
Stony River	14	12	2	6	0	0	0	6	1	0	0	0	0	1	0
Lime Village	7	6	1	0	5	0	0	5	1	0	0	0	0	0	0
McGrath	124	54	4	4	0	0	0	4	1	0	0	0	0	0	1
Takotna	25	25	0	0	0	0	0	0	—	—	—	—	—	—	—
Nikolai	31	29	1	2	0	0	0	2	0	0	0	0	0	0	1
Telida	2	0	—	—	—	—	—	—	—	—	—	—	—	—	—
Upper Kuskokwim	275	194	13	14	23	30	0	67	4	2	0	0	0	1	4
Kuskokwim R.Total	3,729	1,626	394	978	4,178	2,245	587	7,988	14	10	1	3	2	1	167

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Table 16.–Page 2 of 2.

Community	<i>N</i>	Households reporting lost						Total salmon (<i>n</i>)	Reason given for loss						
		<i>n</i>	fish	Chinook	Chum	Sockeye	Coho		Animal	Disease	Equipment	Mngmt	Personal	River cond.	Weather
Quinhagak	173	95	20	106	10	284	79	479	0	1	0	0	0	0	10
Goodnews Bay	76	37	1	0	0	5	0	5	0	0	0	0	0	0	1
Platinum	19	18	5	6	23	39	11	79	0	0	0	0	1	0	3
S. Kuskokwim Bay	268	150	26	112	33	328	90	563	0	1	0	0	1	0	14
Survey Total	4,087	1,776	420	1,090	4,211	2,573	677	8,551	14	11	1	3	3	1	181

Note: Dashes indicate data are unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed.

Table 17.—Comments provided by survey participants regarding subsistence needs for Chinook salmon, 2017.

Community	N	n	Needs Met	No Need	Total not met	Reasons given for reporting needs not met											
						Nonfishery related factors				Natural conditions							
						Did not fish	Personal	Equipment	Expenses	Management (-)	Run Dynamics (-)	River Conditions (-)	Weather	Voluntary conservation	Human theft	Animal	Unknown
Kongiganak	90	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N. Kuskokwim Bay	90	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tuntutuliak	111	60	21	10	29	0	8	2	1	16	0	0	0	0	2	0	0
Eek	99	49	12	14	23	0	11	1	1	9	1	0	0	0	0	0	0
Kasigluk	119	56	10	5	41	3	11	3	2	22	0	0	0	0	0	0	0
Nunapitchuk	121	66	11	6	49	2	12	5	1	29	0	0	0	0	0	0	0
Atmaultluak	71	44	6	1	37	0	4	6	1	25	0	0	0	1	0	0	0
Napakiak	98	45	9	7	29	1	6	3	0	18	1	0	0	0	0	0	0
Napaskiak	105	52	9	10	33	0	5	8	1	19	0	0	0	0	0	0	0
Oscarville	14	11	1	1	9	0	2	0	0	6	0	0	1	0	0	0	0
Bethel	1,844	547	132	179	236	21	97	39	3	54	14	0	1	4	0	0	3
Kwethluk	173	91	18	8	65	1	14	17	0	29	3	1	0	0	0	0	0
Akiachak	169	78	15	7	56	2	9	6	2	33	0	0	2	0	0	1	1
Akiak	91	43	7	2	34	0	4	0	0	30	0	0	0	0	0	0	0
Tuluksak	97	46	8	1	37	0	10	10	0	17	0	0	0	0	0	0	0
Lower Kuskokwim	3,112	1,188	259	251	678	30	193	100	12	307	19	1	4	5	2	1	4
Lower Kalskag	85	31	5	4	22	0	9	4	0	6	2	0	0	0	1	0	0
Upper Kalskag	58	25	5	4	16	0	10	2	0	4	0	0	0	0	0	0	0
Aniak	167	66	14	15	37	1	13	4	0	11	6	0	0	2	0	0	0
Chuathbaluk	32	27	5	4	18	0	7	6	0	4	1	0	0	0	0	0	0
Middle Kuskokwim	342	149	29	27	93	1	39	16	0	25	9	0	0	2	1	0	0

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Table 17.–Page 2 of 2.

Community	N	n	Needs Met	No Need	Total not met	Reasons given for reporting needs not met											
						Nonfishery related factors					Natural conditions						
						Did not fish	Personal	Equipment	Expenses	Management (-)	Run Dynamics (-)	River Conditions (-)	Weather	Voluntary conservation	Human theft	Animal	Unknown
Crooked Creek	33	30	5	3	22	0	5	5	0	10	1	0	1	0	0	0	0
Red Devil	8	7	2	1	4	0	0	0	0	4	0	0	0	0	0	0	0
Sleetmute	31	26	0	12	14	0	5	4	0	2	2	1	0	0	0	0	0
Stony River	14	10	2	5	3	0	2	1	0	0	0	0	0	0	0	0	0
Lime Village	7	6	1	3	2	0	1	0	0	0	0	0	0	0	1	0	0
McGrath	124	53	9	30	14	2	8	2	0	1	0	0	0	1	0	0	0
Takotna	25	25	0	18	7	1	6	0	0	0	0	0	0	0	0	0	0
Nikolai	31	29	14	6	9	0	5	1	1	1	0	1	0	0	0	0	0
Telida	2	0	-	-	0	-	-	-	-	-	-	-	-	-	-	-	-
Upper Kuskokwim R.	275	186	33	78	75	3	32	13	1	18	3	2	1	1	1	0	0
Kuskokwim R. Total	3,819	1,523	321	356	846	34	264	129	13	350	31	3	5	8	4	1	4
Quinhagak	173	86	60	8	18	1	9	6	0	1	0	0	1	0	0	0	0
Goodnews Bay	76	33	14	5	14	1	9	2	0	0	0	0	1	1	0	0	0
Platinum	19	17	2	5	10	0	8	1	0	0	0	0	1	0	0	0	0
S. Kuskokwim Bay	268	136	76	18	42	2	26	9	0	1	0	0	3	1	0	0	0
Survey Total	4,087	1,659	397	374	888	36	290	138	13	351	31	3	8	9	4	1	4

Note: Dashes indicate data is unavailable. Headings are defined as follows: N = the total number of households, n = the number of households surveyed

Table 18.—Comments provided by survey participants regarding subsistence needs for chum salmon, 2017.

Community	N	Needs met	No need	Total needs not met	Reporting needs not met									
					Nonfishery related factors					Natural conditions				
					Did not fish	Personal	Equipment	Expenses	Mngmt. (-)	Run Dynamics (-)	River Cond. (-)	Weather	Human theft	
Kongiganak	90	0	—	—	—	—	—	—	—	—	—	—	—	—
N. Kuskokwim Bay	90	0	—	—	—	—	—	—	—	—	—	—	—	—
Tuntutuliak	111	61	37	14	10	0	3	1	0	5	0	0	0	1
Eek	99	49	22	20	7	0	3	1	1	2	0	0	0	0
Kasigluk	119	61	40	6	15	1	9	1	1	2	0	0	1	0
Nunapitchuk	121	68	39	9	20	2	7	5	0	6	0	0	0	0
Atmautluak	71	44	24	3	17	0	5	6	2	3	0	0	1	0
Napakiak	98	46	23	7	16	1	5	2	0	8	0	0	0	0
Napaskiak	105	52	25	13	14	0	4	5	0	5	0	0	0	0
Oscarville	14	12	5	3	4	0	1	0	0	2	1	0	0	0
Bethel	1,844	546	190	236	120	20	56	33	3	4	3	0	1	0
Kwethluk	173	92	50	8	34	1	9	16	1	7	0	0	0	0
Akiachak	169	79	49	8	22	1	7	5	0	9	0	0	0	0
Akiak	91	42	30	5	7	0	2	0	0	5	0	0	0	0
Tuluksak	97	51	24	3	24	0	8	10	0	5	0	0	1	0
Lower Kuskokwim	3,112	1,203	558	335	310	26	119	85	8	63	4	0	4	1
Lower Kalskag	85	33	12	7	14	0	8	4	0	1	0	0	0	1
Upper Kalskag	58	26	10	6	10	0	9	1	0	0	0	0	0	0
Aniak	167	66	22	28	16	2	8	4	0	2	0	0	0	0
Chuathbaluk	32	26	11	6	9	0	5	4	0	0	0	0	0	0
Middle Kuskokwim	342	151	55	47	49	2	30	13	0	3	0	0	0	1
Crooked Creek	33	29	12	4	13	1	4	3	0	5	0	0	0	0
Red Devil	8	7	3	4	0	0	0	0	0	0	0	0	0	0
Sleetmute	31	27	4	15	8	0	5	3	0	0	0	0	0	0
Stony River	14	11	2	7	2	0	1	1	0	0	0	0	0	0
Lime Village	7	6	4	2	0	0	0	0	0	0	0	0	0	0
McGrath	124	52	6	36	10	1	6	2	0	1	0	0	0	0
Takotna	25	25	0	18	7	1	6	0	0	0	0	0	0	0
Nikolai	31	29	7	14	8	0	6	1	0	0	0	1	0	0
Telida	2	0	—	—	0	—	—	—	—	—	—	—	—	—
Upper Kuskokwim	275	186	38	100	48	3	28	10	0	6	0	1	0	0
Kuskokwim R. Total	3,819	1,540	651	482	407	31	177	108	8	72	4	1	4	2

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Table 18.–Page 2 of 2.

Community	N	n	Needs met	No need	Total needs not met	Reporting needs not met								
						Nonfishery related factors				Natural conditions				
						Did not fish	Personal	Equipment	Expenses	Mngmt. (-)	Run Dynamics (-)	River Cond. (-)	Weather	Human theft
Quinhagak	173	87	51	29	7	0	3	3	0	0	1	0	0	0
Goodnews Bay	76	32	11	13	8	1	5	2	0	0	0	0	0	0
Platinum	19	17	6	10	1	0	1	0	0	0	0	0	0	0
S. Kuskokwim Bay	268	136	68	52	16	1	9	5	0	0	1	0	0	0
Survey Total	4,087	1,676	719	534	423	32	186	113	8	72	5	1	4	2

Note: Dashes indicate data are unavailable. Headings are defined as follows: *N* = the total number of households, *n* = the number of households surveyed.

Table 19.—Comments provided by survey participants regarding subsistence needs for sockeye salmon, 2017.

Community	N	Needs n met	No need	Total needs not met	Reporting needs not met										
					Did not fish	Nonfishery related factors			Mngmt. (-)	Natural conditions			Human theft	Unk.	
						Personal	Equipment	Expenses		Run Dynamics (-)	River Cond. (-)	Weather			
Kongiganak	90	0	—	—	—	—	—	—	—	—	—	—	—	—	—
N. Kuskokwim Bay	90	0	—	—	—	—	—	—	—	—	—	—	—	—	—
Tuntutuliak	111	60	30	8	22	1	6	3	0	10	0	0	0	2	0
Eek	99	49	25	10	14	0	7	1	2	4	0	0	0	0	0
Kasigluk	119	60	30	4	26	2	10	3	2	8	1	0	0	0	0
Nunapitchuk	121	63	23	5	35	2	15	5	0	12	1	0	0	0	0
Atmautluak	71	43	21	1	21	0	4	7	2	8	0	0	0	0	0
Napakiak	98	45	17	6	22	1	6	3	0	12	0	0	0	0	0
Napaskiak	105	52	23	11	18	0	4	5	0	9	0	0	0	0	0
Oscarville	14	12	5	1	6	0	1	0	0	3	1	0	1	0	0
Bethel	1,844	545	207	167	171	22	82	37	3	20	4	0	2	0	1
Kwethluk	173	91	41	9	41	1	8	17	1	13	0	0	1	0	0
Akiachak	169	78	49	4	25	1	10	5	0	9	0	0	0	0	0
Akiak	91	44	32	2	10	0	3	0	0	7	0	0	0	0	0
Tuluksak	97	48	22	1	25	0	9	10	0	5	0	0	1	0	0
Lower Kuskokwim	3,112	1,190	525	229	436	30	165	96	10	120	7	0	5	2	1
Lower Kalskag	85	32	8	7	17	0	9	4	0	3	0	0	0	1	0
Upper Kalskag	58	26	11	4	11	0	9	1	0	0	1	0	0	0	0
Aniak	167	65	19	22	24	3	14	4	1	2	0	0	0	0	0
Chuathbaluk	32	27	15	2	10	0	6	4	0	0	0	0	0	0	0
Middle Kuskokwim	342	150	53	35	62	3	38	13	1	5	1	0	0	1	0
Crooked Creek	33	29	12	3	14	0	4	3	0	7	0	0	0	0	0
Red Devil	8	7	5	1	1	0	0	0	0	1	0	0	0	0	0
Sleetmute	31	27	10	6	11	0	4	5	0	0	1	0	1	0	0
Stony River	14	11	6	3	2	0	2	0	0	0	0	0	0	0	0
Lime Village	7	6	5	1	0	0	0	0	0	0	0	0	0	0	0
McGrath	124	53	9	31	13	2	7	3	0	1	0	0	0	0	0
Takotna	25	25	3	17	5	0	5	0	0	0	0	0	0	0	0
Nikolai	31	29	1	20	8	0	6	0	1	0	0	1	0	0	0
Telida	2	0	—	—	—	—	—	—	—	—	—	—	—	—	—
Upper Kuskokwim	275	187	51	82	54	2	28	11	1	9	1	1	1	0	0
Kuskokwim R. Total	3,729	1,527	629	346	552	35	231	120	12	134	9	1	6	3	1

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Table 19.–Page 2 of 2.

Community	N	n	Needs met	No need	Total needs not met	Reporting needs not met									
						Nonfishery related factors				Natural conditions					
						Did not fish	Personal	Equipment	Expenses	Mngmt. (-)	Run Dynamics (-)	River Cond. (-)	Weather	Human theft	Unk.
Quinhagak	173	87	59	14	14	0	9	5	0	0	0	0	0	0	0
Goodnews Bay	76	34	17	5	12	1	9	2	0	0	0	0	0	0	0
Platinum	19	17	13	1	3	0	3	0	0	0	0	0	0	0	0
S. Kuskokwim Bay	268	138	89	20	29	1	21	7	0	0	0	0	0	0	0
Survey Total	4,087	1,665	718	366	581	36	252	127	12	134	9	1	6	3	1

Note: Dashes indicate data are unavailable. Headings are defined as follows: N = the total number of households, n = the number of households surveyed.

Table 20.—Comments provided by survey participants regarding subsistence needs for coho salmon, 2017.

Community	N	Needs n met	No need	Total needs not met	Reporting needs not met										
					Nonfishery related factors				Natural conditions						
					Did not fish	Personal	Equipment	Expenses	Mngmt. (-)	Run Dynamics (-)	River Cond. (-)	Weather	Human theft	Unk.	
Kongiganak	90	0	—	—	—	—	—	—	—	—	—	—	—	—	—
N. Kuskokwim Bay	90	0	—	—	—	—	—	—	—	—	—	—	—	—	—
Tuntutuliak	111	61	23	25	13	2	5	2	0	1	0	0	3	0	0
Eek	99	49	21	16	12	0	8	0	1	3	0	0	0	0	0
Kasigluk	119	60	14	20	26	5	9	4	5	2	0	0	1	0	0
Nunapitchuk	121	65	19	14	32	6	15	6	1	1	3	0	0	0	0
Atmautluak	71	43	12	6	25	1	8	8	6	1	0	0	1	0	0
Napakiak	98	45	11	12	22	1	11	4	0	4	0	0	2	0	0
Napaskiak	105	51	21	16	14	0	4	5	0	4	0	0	1	0	0
Oscarville	14	11	5	3	3	1	2	0	0	0	0	0	0	0	0
Bethel	1,844	545	242	159	144	19	67	43	5	6	1	1	2	0	0
Kwethluk	173	91	34	16	41	3	12	18	1	7	0	0	0	0	0
Akiachak	169	78	34	19	25	2	10	5	0	6	0	0	2	0	0
Akiak	91	43	24	10	9	1	4	0	1	1	1	1	0	0	0
Tuluksak	97	51	14	6	31	2	12	9	1	5	0	0	2	0	0
Lower Kuskokwim	3,112	1,193	474	322	397	43	167	104	21	41	5	2	4	0	0
Lower Kalskag	85	31	8	9	14	0	9	3	0	1	0	0	0	1	0
Upper Kalskag	58	24	6	6	12	0	8	2	0	0	0	0	2	0	0
Aniak	167	66	23	17	26	1	14	4	0	2	3	1	0	0	1
Chuathbaluk	32	27	9	7	11	0	7	4	0	0	0	0	0	0	0
Middle Kuskokwim	342	148	46	39	63	1	38	13	0	3	3	1	2	1	1
Crooked Creek	33	29	9	4	16	1	5	5	0	5	0	0	0	0	0
Red Devil	8	7	4	2	1	0	1	0	0	0	0	0	0	0	0
Sleetmute	31	27	7	10	10	0	5	4	0	0	0	1	0	0	0
Stony River	14	11	4	2	5	0	2	2	0	0	0	1	0	0	0
Lime Village	7	6	4	2	0	0	0	0	0	0	0	0	0	0	0
McGrath	124	52	13	26	13	2	7	2	0	1	1	0	0	0	0
Takotna	25	25	0	18	7	1	6	0	0	0	0	0	0	0	0
Nikolai	31	29	3	15	11	0	8	1	1	0	0	1	0	0	0
Telida	2	0	—	—	0	—	—	—	—	—	—	—	—	—	—
Upper Kuskokwim	275	186	44	79	63	4	34	14	1	6	1	3	0	0	0
Kuskokwim R. Total	3,819	1,527	564	440	523	48	239	131	22	50	9	6	16	1	1

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Table 20.–Page 2 of 2.

Community	N	n	Needs met	No need	Total needs not met	Reporting needs not met										
						Did not fish	Nonfishery related factors			Natural conditions				Human theft	Unk.	
							Personal	Equipment	Expenses	Mngmt. (-)	Run Dynamics (-)	River Cond. (-)	Weather			
Quinhagak	173	85	48	21	16	1	10	3	0	0	0	0	0	2	0	0
Goodnews Bay	76	33	16	7	10	1	7	2	0	0	0	0	0	0	0	0
Platinum	19	17	11	3	3	0	3	0	0	0	0	0	0	0	0	0
S. Kuskokwim Bay	268	135	75	31	29	2	20	5	0	0	0	0	0	2	0	0
Survey Total	4,087	1,662	639	471	552	50	259	136	22	50	9	6	18	1	1	1

Note: Dashes indicate data are unavailable. Headings are defined as follows: N = the total number of households, n = the number of households surveyed.

Table 21.—Estimated harvest of nonsalmon fish, including those caught in the winter prior to the survey season, Kuskokwim Area, 2017.

Community	Humpback whitefish		Broad whitefish		Cisco		Sheefish		Burbot		Pike	
	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)
Kongiganak	—	—	—	—	—	—	—	—	—	—	—	—
N. Kuskokwim Bay	—	—	—	—	—	—	—	—	—	—	—	—
Tuntutuliak	2,439	873	931	343	77	65	150	97	1,038	390	2,357	605
Eek	865	293	654	357	162	87	82	62	481	176	2,045	755
Kasigluk	2,544	704	7,702	3,030	0	0	13	8	167	85	10,322	3,456
Nunapitchuk	1,565	634	3,624	1,399	78	38	33	21	346	189	13,435	3,849
Atmaultluak	1,089	389	2,631	1,711	94	148	43	12	49	17	3,126	1,291
Napakiak	408	183	468	185	0	0	101	75	252	141	5,901	3,234
Napaskiak	800	412	1,439	699	65	63	108	45	363	161	3,820	1,387
Oscarville	29	19	48	24	0	0	0	0	64	16	1,370	415
Bethel	2,940	1,959	4,013	2,194	1,055	1,114	852	365	2,537	1,344	29,937	6,044
Kwethluk	1,134	417	1,702	682	55	51	1,117	1,248	1,452	1,008	5,416	1,835
Akiachak	1,160	421	838	266	93	89	128	47	1,278	379	3,565	1,288
Akiak	2,186	1,218	1,039	419	69	62	512	282	621	515	3,257	2,538
Tuluksak	558	302	1,250	644	155	112	112	57	114	98	2,296	739
Lower Kuskokwim	17,717	7,824	26,339	11,953	1,903	1,829	3,251	2,319	8,762	4,519	86,847	27,436
Lower Kalskag	487	318	511	260	21	22	36	23	99	111	29	21
Upper Kalskag	121	100	104	99	184	195	116	63	34	31	42	36
Aniak	2,416	162	1,556	134	25,523	103	191	58	194	80	203	94
Chuathbaluk	140	95	55	11	0	0	62	24	26	21	26	23
Middle Kuskokwim	3,164	675	2,226	504	25,728	320	405	168	353	243	300	174
Crooked Creek	137	15	115	20	67	54	138	19	5	3	0	0
Red Devil	191	0	95	0	2	0	82	0	0	0	29	0
Sleetmute	24	5	197	15	83	14	46	19	21	10	14	5
Stony River	70	29	137	97	0	0	25	14	29	19	112	110
Lime Village	18	8	118	25	21	13	0	0	0	0	63	4
McGrath	64	42	287	196	68	78	238	90	0	0	250	93
Takotna	0	0	0	0	0	0	0	0	0	0	18	0
Nikolai	91	22	284	228	80	0	58	7	0	0	302	48
Telida	—	—	—	—	—	—	—	—	—	—	—	—
Upper Kuskokwim	595	121	1,233	581	321	159	587	149	55	32	788	260
Kuskokwim R. Total	21,476	8,620	29,798	13,038	27,952	2,308	4,243	2,636	9,170	4,794	87,935	27,870

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Table 21.–Page 2 of 2.

Community	Humpback whitefish		Broad whitefish		Cisco		Sheefish		Burbot		Pike	
	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)
Quinhagak	474	615	389	213	418	209	7	3	52	43	3,458	2,194
Goodnews Bay	0	0	20	29	32	47	0	0	0	0	0	0
Platinum	0	0	0	0	3	0	0	0	0	0	0	0
S. Kuskokwim Bay	474	615	409	242	453	256	7	3	52	43	3,458	2,194
Survey Total	21,950	9,235	30,207	13,280	28,405	2,564	4,250	2,639	9,222	4,837	91,393	30,064

Note: Dashes indicate data are unavailable. CI (95%) = 95% confidence interval.

Table 22.—Estimated harvest of nonsalmon fish, including those caught in the winter prior to the survey season, Kuskokwim Area, 2017.

Community	Alaska blackfish		Arctic grayling		Char/Dolly Varden		Pacific herring		Smelt		Rainbow trout	
	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)
Kongiganak	—	—	—	—	—	—	—	—	—	—	—	—
N. Kuskokwim Bay	—	—	—	—	—	—	—	—	—	—	—	—
Tuntutuliak	8,599	2,985	17	25	4	2	0	0	517	422	0	0
Eek	9,130	7,422	73	40	36	53	136	197	1,045	1,182	0	0
Kasigluk	16,806	8,333	0	0	0	0	270	438	2,069	1,249	4	5
Nunapitchuk	27,139	11,234	0	0	0	0	0	0	3,462	876	2	2
Atmaultluak	8,150	3,245	0	0	60	99	0	0	5,614	1,369	0	0
Napakiak	5,854	4,320	0	0	1	1	0	0	3,597	2,142	0	0
Napaskiak	4,522	4,332	0	0	19	31	0	0	1,968	1,091	0	0
Oscarville	1,478	447	0	0	0	0	0	0	479	106	0	0
Bethel	22,923	13,803	739	627	697	573	4,983	4,025	37,260	8,749	642	441
Kwethluk	9,058	10,459	75	33	101	61	0	0	8,882	2,577	127	86
Akiachak	18,555	10,595	9	13	2	3	0	0	10,915	2,890	2	3
Akiak	1,843	1,211	109	42	196	171	32	29	10,884	3,848	172	106
Tuluksak	3,113	2,676	108	43	13	17	70	107	19,099	5,461	30	0
Lower Kuskokwim	137,170	81,062	1,130	823	1,129	1,011	5,491	4,796	105,791	31,962	979	643
Lower Kalskag	364	507	5	7	9	11	0	0	2,741	1,034	0	0
Upper Kalskag	280	407	0	0	3	3	0	0	2,623	840	0	0
Aniak	108	78	172	86	201	77	0	0	3,016	2,008	42	17
Chuathbaluk	0	0	246	32	2	2	0	0	154	138	1	1
Middle Kuskokwim	752	992	423	125	215	93	0	0	8,534	4,020	43	18
Crooked Creek	0	0	41	6	17	7	0	0	0	0	4	2
Red Devil	0	0	45	0	0	0	0	0	0	0	0	0
Sleetmute	0	0	394	97	9	5	0	0	0	0	0	0
Stony River	0	0	22	14	0	0	0	0	0	0	0	0
Lime Village	0	0	30	11	0	0	0	0	0	0	0	0
McGrath	0	0	317	284	0	0	0	0	0	0	4	6
Takotna	0	0	45	0	0	0	0	0	0	0	0	0
Nikolai	44	40	46	34	4	2	0	0	0	0	0	0
Telida	—	—	—	—	—	—	—	—	—	—	—	—
Upper Kuskokwim	44	40	940	446	30	14	0	0	0	0	8	8
Kuskokwim R. Total	137,966	82,094	2,493	1,394	1,374	1,118	5,491	4,796	114,325	35,982	1,030	669

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Table 22.—Page 2 of 2.

Community	Alaska blackfish		Arctic grayling		Char/Dolly Varden		Pacific herring		Smelt		Rainbow trout	
	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)	Total	CI (95%)
Quinhagak	3,965	2,648	119	61	3,182	675	1,234	459	12,737	3,626	121	90
Goodnews Bay	0	0	68	60	1,275	583	3,098	3,268	812	523	12	9
Platinum	5	0	46	17	635	235	949	0	719	147	5	0
S. Kuskokwim Bay	3,970	2,648	233	138	5,092	1,493	5,281	3,727	14,268	4,296	138	99
Survey Total	141,936	84,742	2,726	1,532	6,466	2,611	10,772	8,523	128,593	40,278	1,168	768

Note: Dashes indicate data are unavailable. CI (95%) = 95% confidence interval.

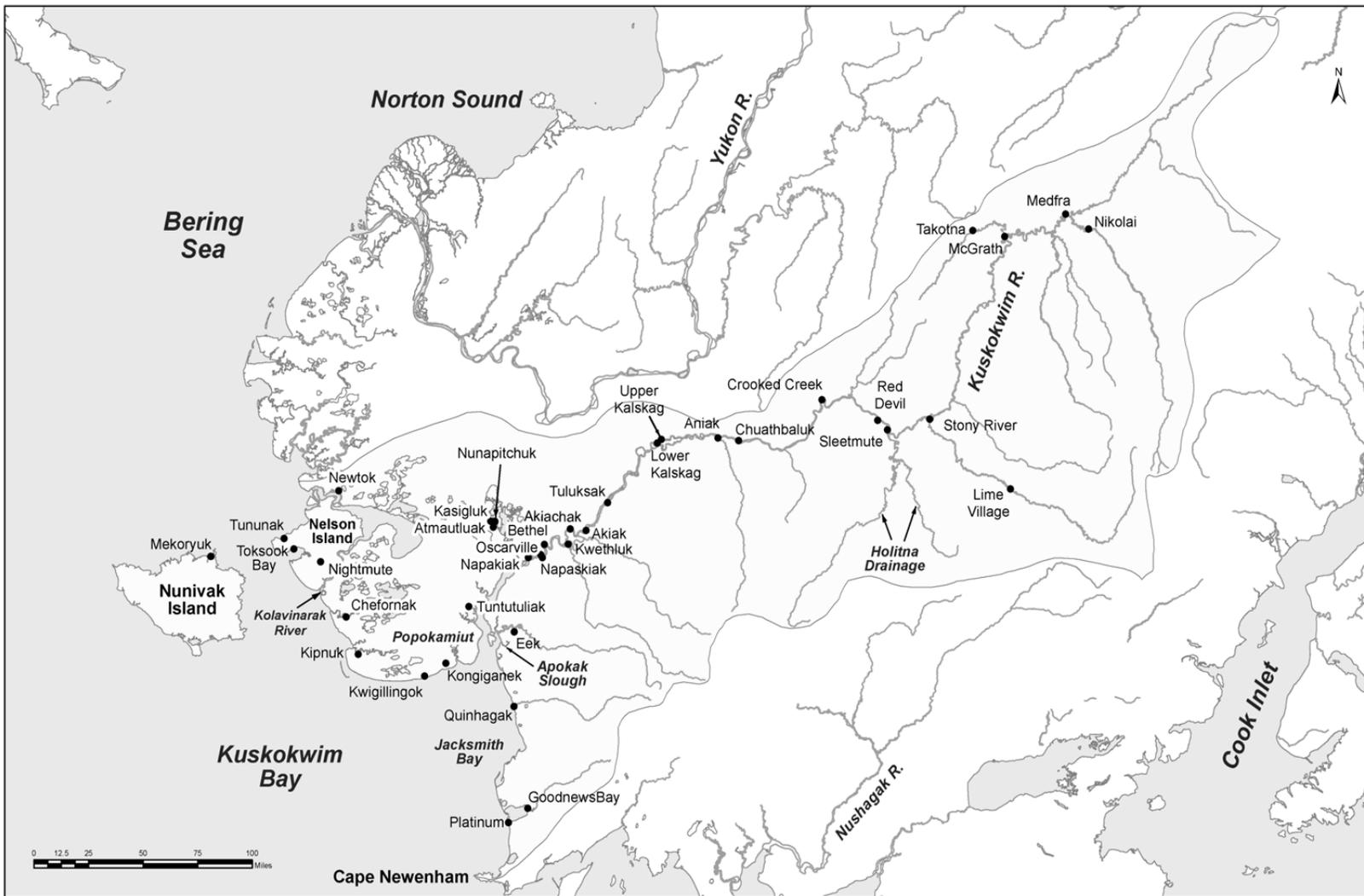


Figure 1.—Kuskokwim management area.

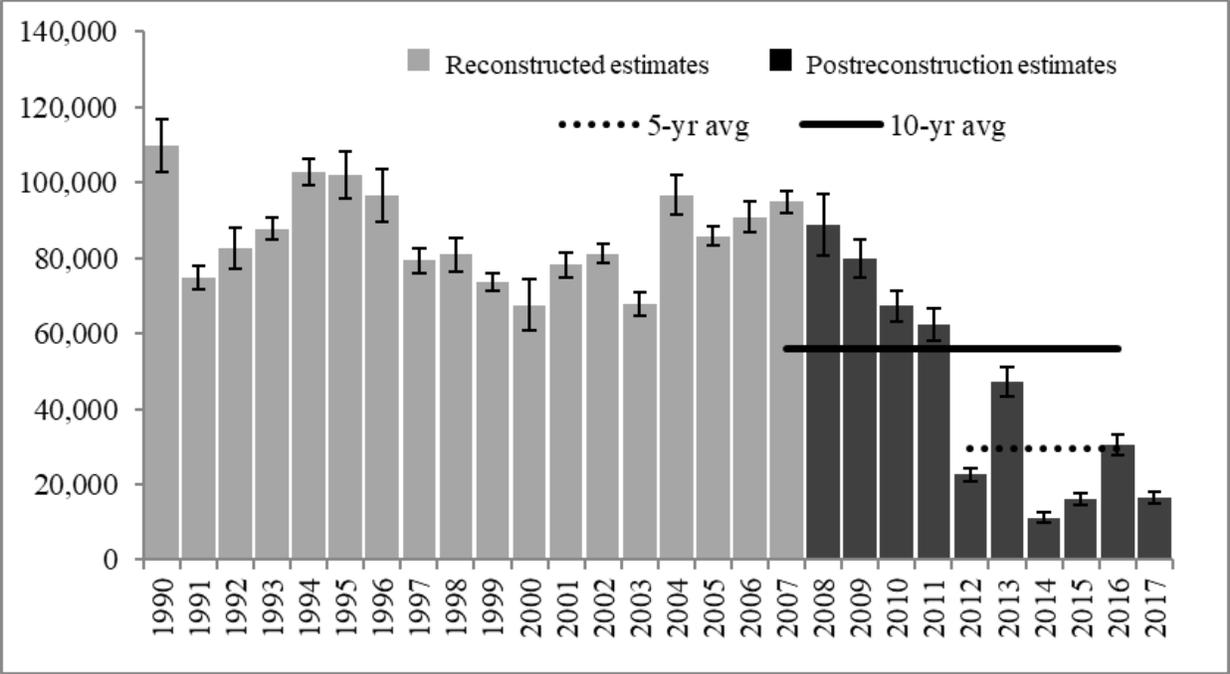


Figure 2.—Historical subsistence harvest estimates of Chinook salmon in the Kuskokwim River.

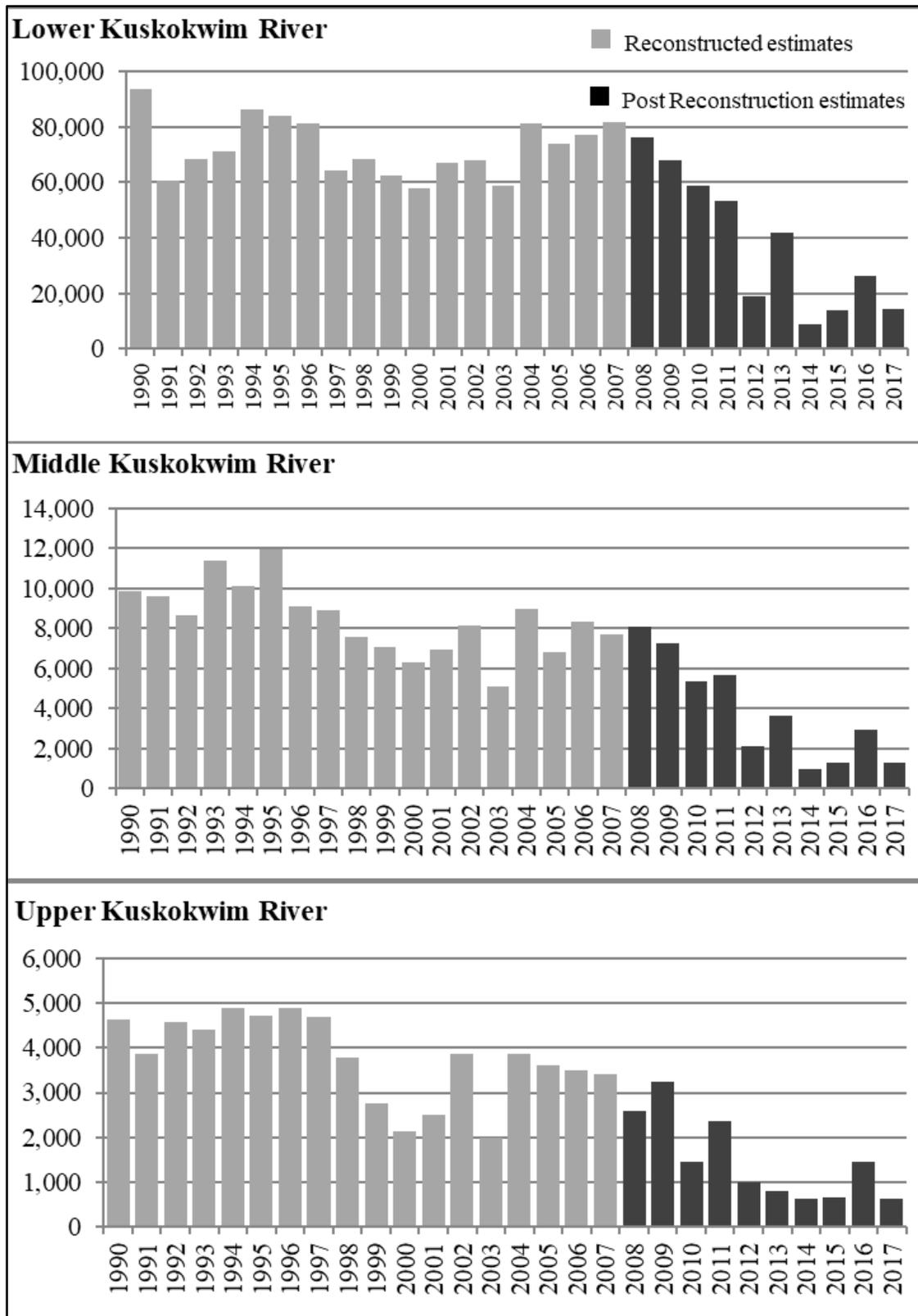


Figure 3.—Historical subsistence harvest estimates of Chinook salmon in the Kuskokwim River by subarea.

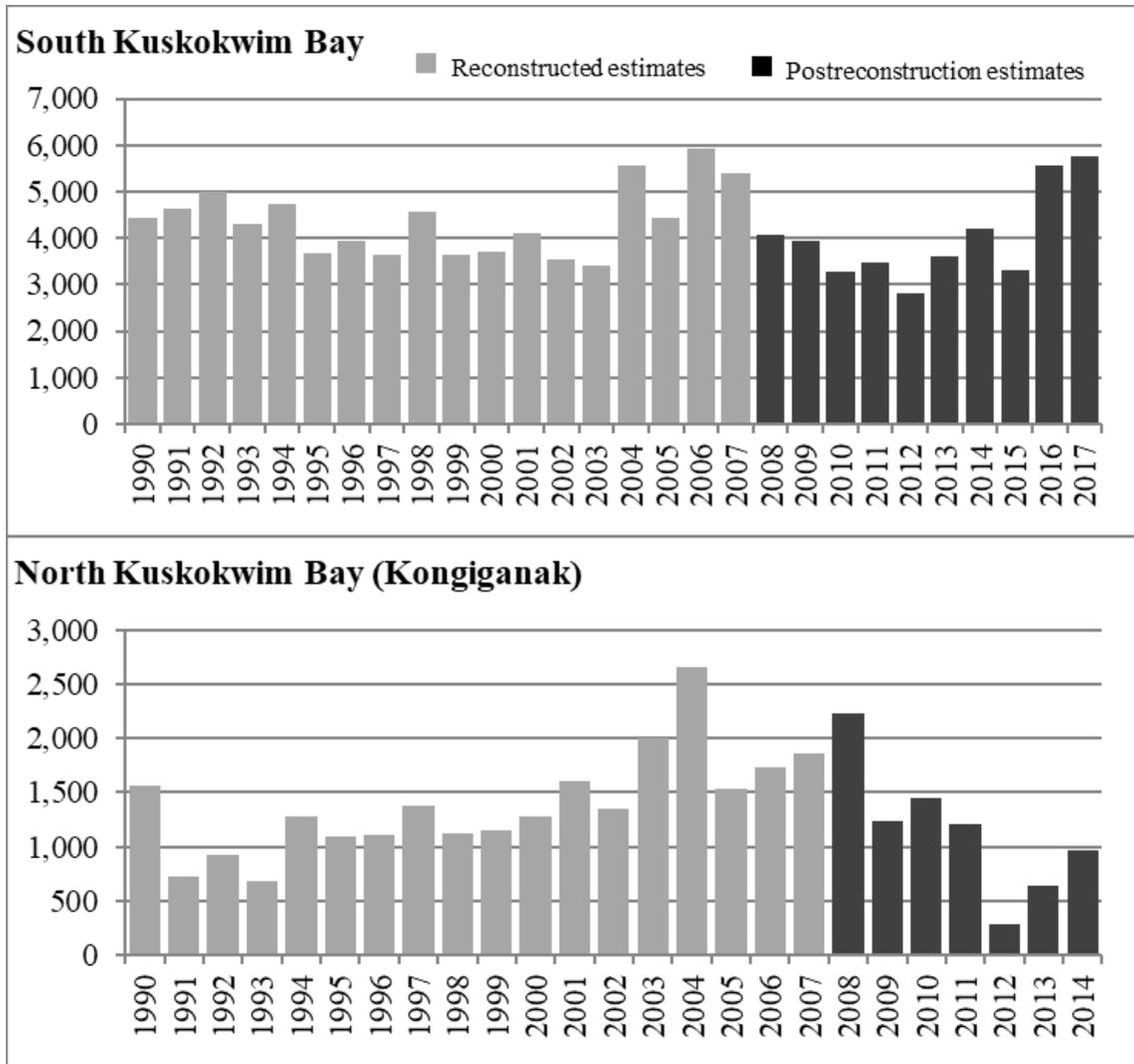


Figure 4.—Historical subsistence harvest estimates of Chinook salmon in the South Kuskokwim Bay by subarea.

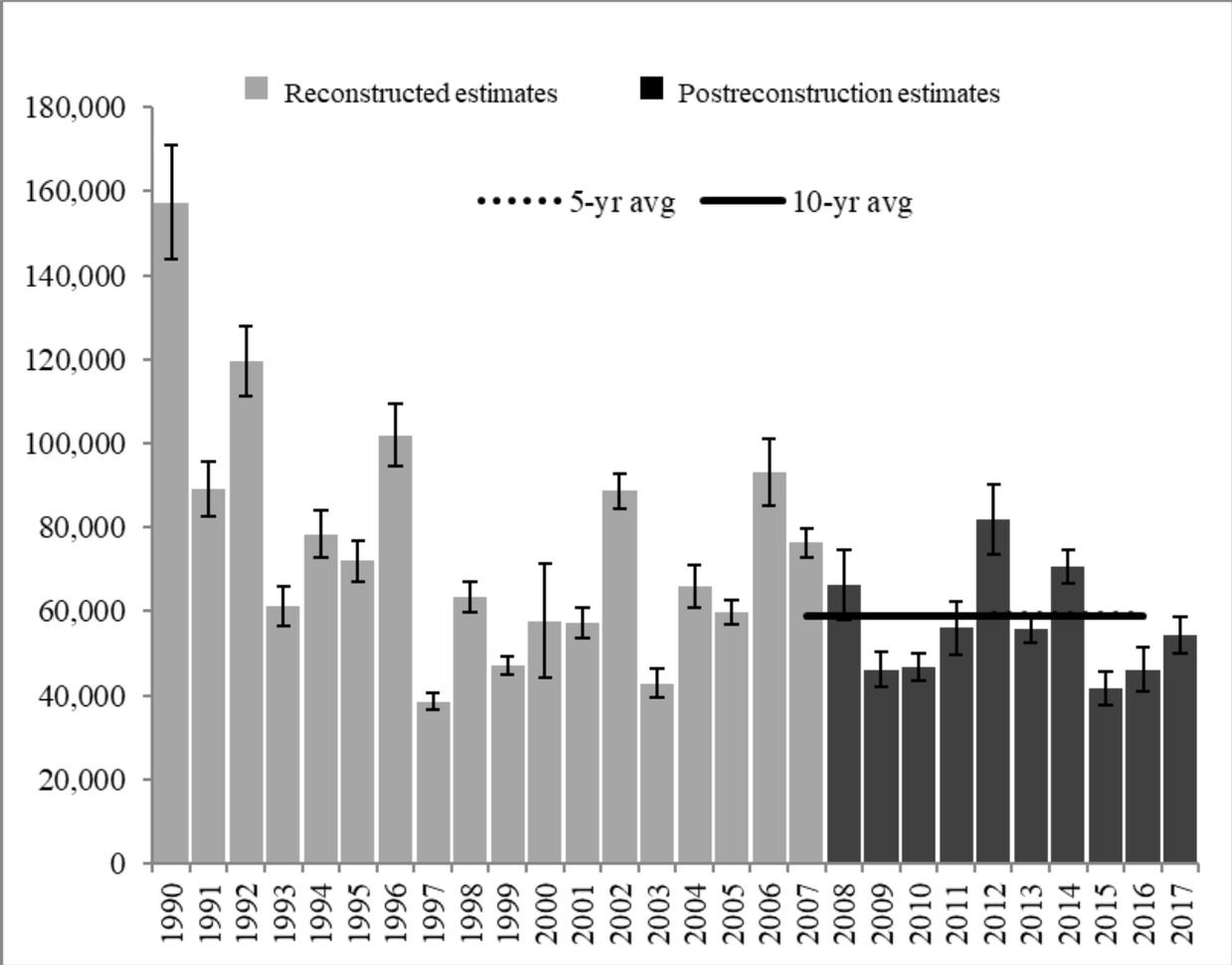


Figure 5.—Historical subsistence harvest estimates of chum salmon in the Kuskokwim Area (Kuskokwim River and Bay).

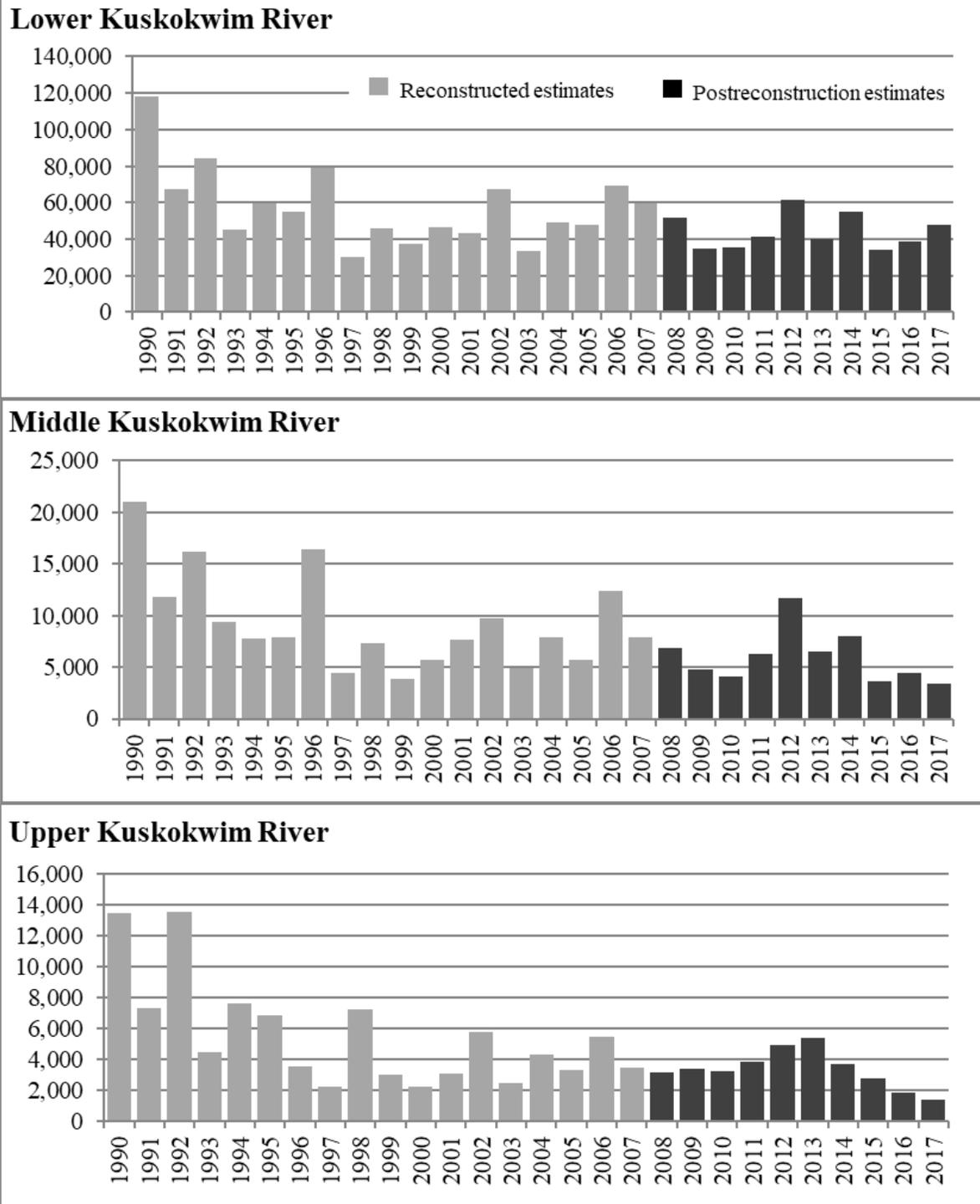


Figure 6.—Historical subsistence harvest estimates of chum salmon in the Kuskokwim River by subarea.

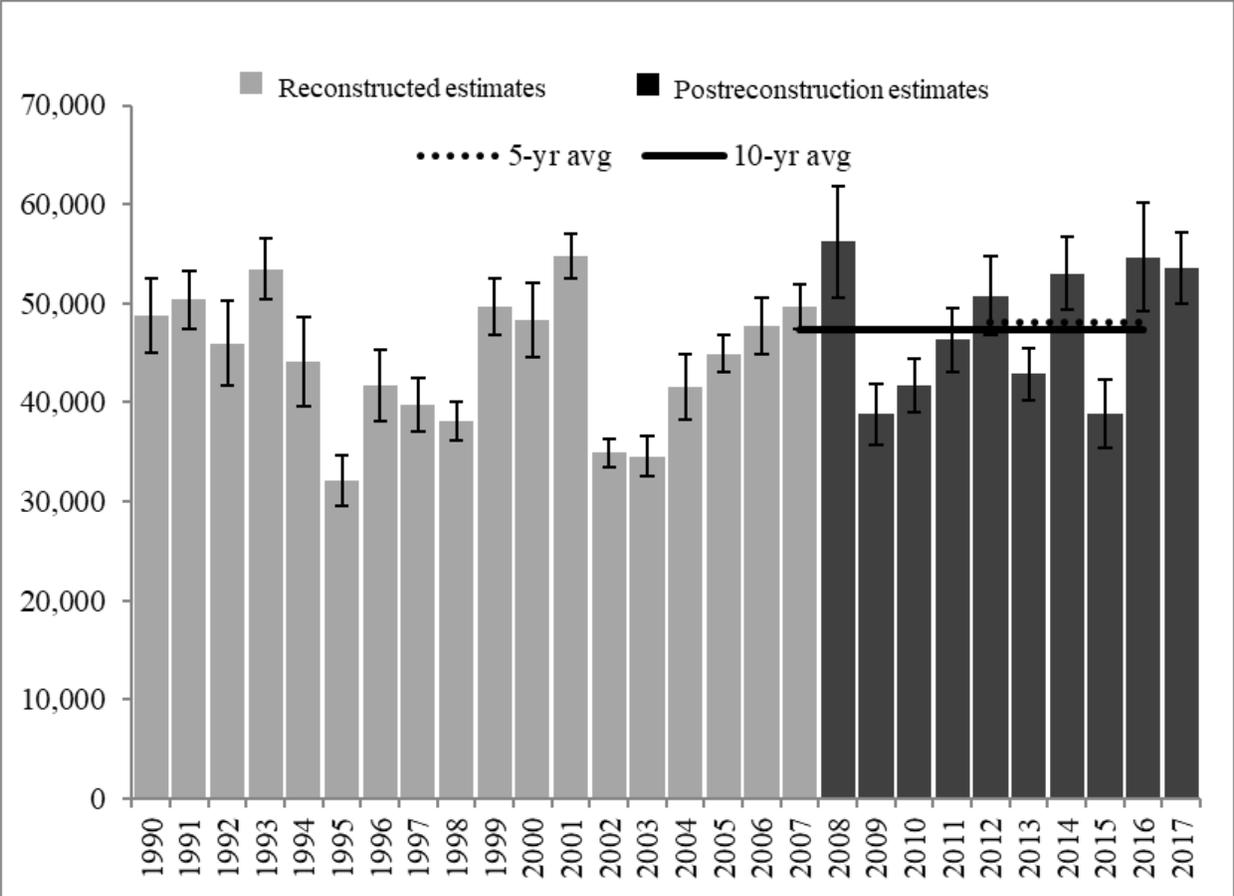


Figure 7.—Historical subsistence harvest estimates of sockeye salmon in the Kuskokwim Area.

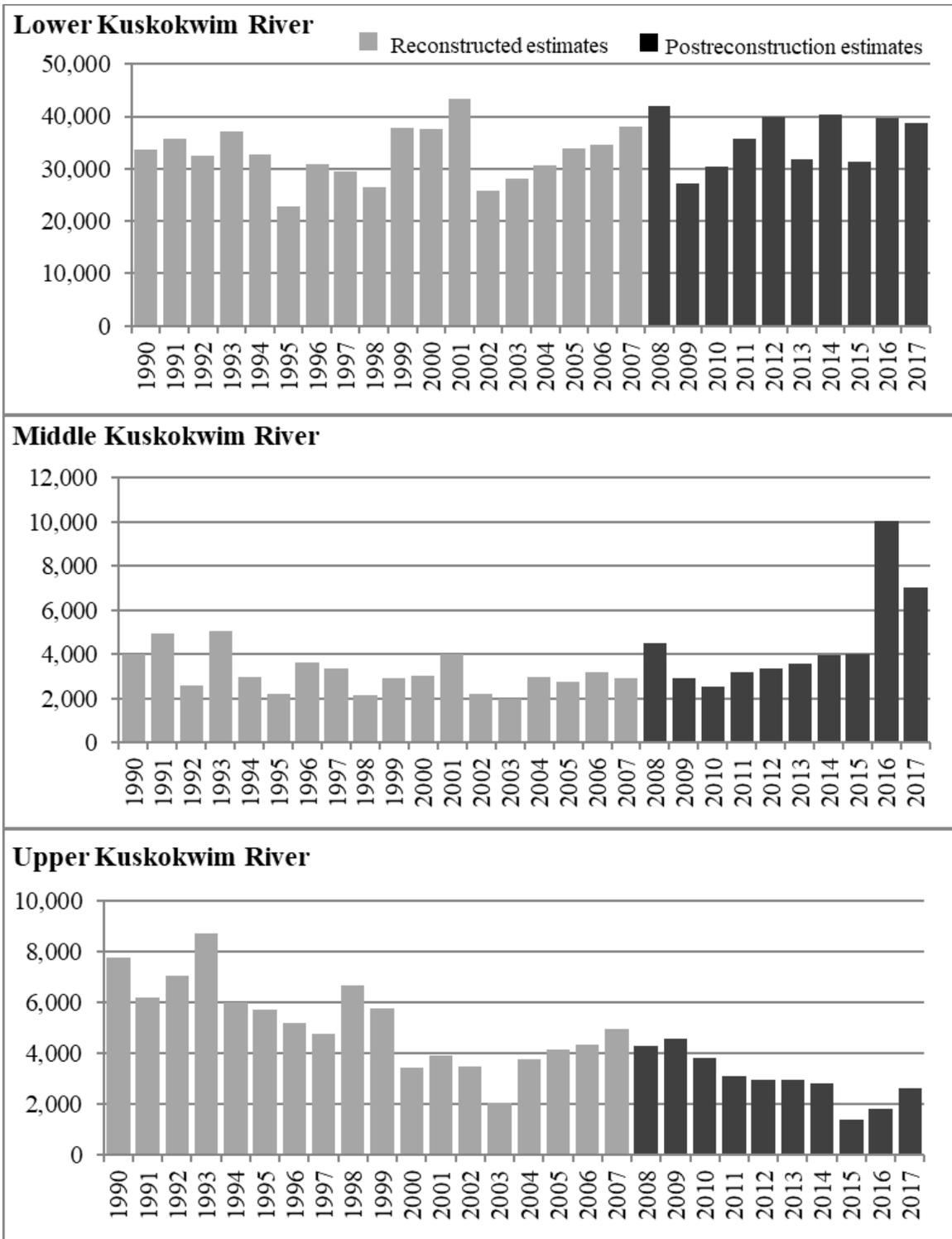


Figure 8.—Historical subsistence harvest estimates of sockeye salmon in the Kuskokwim River by subarea.

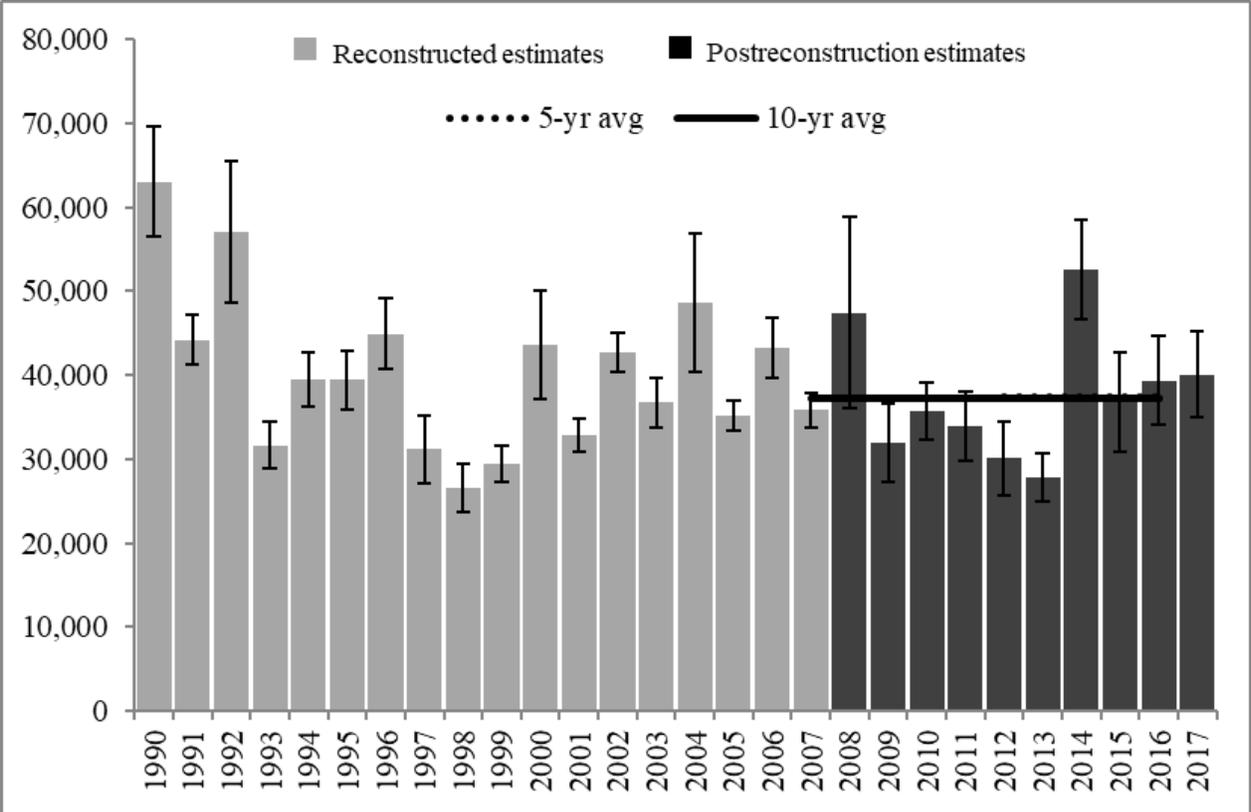


Figure 9.—Historical subsistence harvest estimates of coho salmon in the Kuskokwim Area.

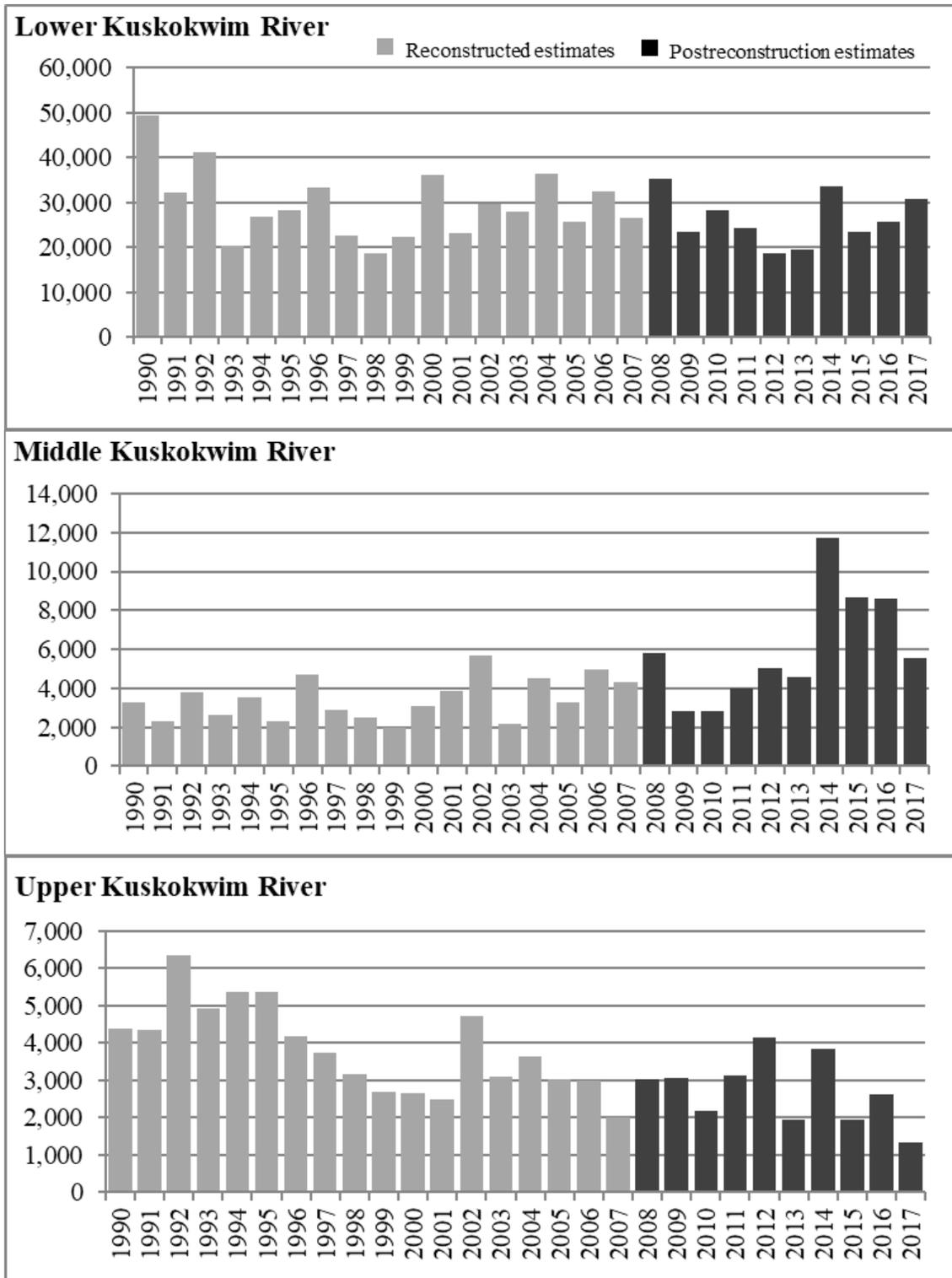


Figure 10.—Historical subsistence harvest estimates of coho salmon in the Kuskokwim River by subarea.

**APPENDIX A:
ESTIMATED NUMBER OF SALMON HARVESTED FOR
SUBSISTENCE IN THE KUSKOKWIM AREA, 2007–2017**

Appendix A1.–Estimated number of Chinook salmon harvested for subsistence in the Kuskokwim Area, 2007–2017

Community	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average 2012–2016	Average 2007–2016
Kongiganak ^a	1,865	2,233	1,243	1,456	1,208	287	641	964	–	–	–	631	1,237
N. Kuskokwim Bay	1,865	2,233	1,243	1,456	1,208	287	641	964	0	0	0	378	990
Tuntutuliak	4,614	4,266	3,067	3,261	3,032	1,123	2,448	574	1,668	1,963	1,459	1,555	2,602
Eek	2,512	2,966	1,982	1,761	1,378	1,004	1,188	665	850	1,460	825	1,033	1,577
Kasigluk ^b	5,167	2,471	2,464	3,014	2,823	552	2,919	205	438	951	791	1,013	2,100
Nunapitchuk ^b	4,661	4,234	3,468	2,548	3,559	845	2,563	287	1,051	1,695	761	1,288	2,491
Atmaultluak ^b	1,890	1,298	1,567	1,088	1,236	234	1,592	108	514	763	195	642	1,029
Napakiak ^b	3,245	1,903	2,387	1,674	1,963	457	1,588	311	917	1,151	505	885	1,560
Napaskiak ^b	6,392	4,555	5,372	4,333	3,360	1,108	2,939	422	816	1,535	858	1,364	3,083
Oscarville ^b	1,360	1,351	754	618	694	51	585	68	120	208	122	206	581
Bethel ^c	30,422	27,800	26,170	26,157	25,093	7,321	17,246	3,089	4,918	9,462	5,336	8,407	17,768
Kwethluk ^b	6,466	8,451	7,130	4,440	2,467	1,709	3,192	959	900	1,731	1,019	1,698	3,745
Akiachak ^b	7,621	9,719	7,361	4,470	3,852	2,862	3,585	1,033	1,103	3,438	1,415	2,404	4,504
Akiak ^b	4,297	4,090	3,247	3,625	2,455	1,218	1,449	530	610	1,274	694	1,016	2,279
Tuluksak	3,266	2,937	3,212	2,057	1,230	651	732	404	231	709	511	545	1,543
Lower Kuskokwim	81,914	76,040	68,181	59,046	53,142	19,135	42,026	8,655	14,136	26,340	14,491	22,058	44,861
Lower Kalskag ^b	1,937	1,748	2,525	1,030	1,260	459	744	283	351	578	260	483	1,092
Upper Kalskag ^b	1,383	2,435	1,696	1,496	1,772	562	1,317	258	334	838	190	662	1,209
Aniak ^b	3,417	3,100	2,130	2,262	2,214	993	1,440	344	542	1,293	718	922	1,774
Chuathbaluk	973	772	877	551	409	103	155	90	90	203	100	128	422
Middle Kuskokwim	7,710	8,055	7,228	5,339	5,655	2,117	3,656	975	1,317	2,912	1,268	2,195	4,496
Crooked Creek	647	488	608	240	402	124	145	35	78	384	110	153	315
Red Devil	301	148	258	33	186	225	77	83	52	69	38	101	143
Sleetmute	861	933	693	272	242	132	96	58	137	169	36	118	359
Stony River	530	514	704	189	134	151	51	24	25	33	109	57	235
Lime Village	95	29	75	47	118	29	43	32	–	35	33	35	56
McGrath ^b	495	288	600	262	829	68	95	173	75	384	118	159	327
Takotna	10	0	8	0	0	0	0	0	3	0	0	1	2
Nikolai	471	184	298	402	450	276	283	235	301	367	177	292	327
Telida ^a	–	–	–	–	–	–	–	–	–	–	–	0	0
Upper Kuskokwim	3,409	2,584	3,244	1,445	2,361	1,005	790	640	671	1,441	621	909	1,759
Kuskokwim River Total	94,898	88,912	79,896	67,286	62,366	22,544	47,113	11,234	16,124	30,693	16,380	25,541	52,107

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Appendix A1.–Page 2 of 2.

Community	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average 2012–2016	Average 2007–2016
Quinhagak	4,686	3,125	3,312	2,793	2,588	2,396	3,143	3,723	3,082	4,822	5,217	3,433	3,367
Goodnews Bay	647	898	569	480	834	389	413	431	220	654	457	421	553
Platinum	66	42	61	17	62	24	39	46	11	99	96	44	47
South Kuskokwim Bay	5,399	4,065	3,942	3,290	3,484	2,809	3,595	4,200	3,313	5,575	5,770	3,898	3,967
Total Estimated Harvest	100,297	92,977	83,838	70,576	65,850	25,353	50,708	15,434	19,437	36,268	22,150	29,440	56,074

Note: Dashes indicate harvest was not estimated; bold font indicates Bayesian estimate.

^a Villages not surveyed in 2017. Harvest was not estimated due to lack of recent data.

^b 2017 estimate includes a tally of Chinook salmon harvested under the USFWS issued permits.

^c The 2017 Bethel estimate contains both the permit numbers from Bethel and the seasonal village of Napaimute.

Appendix A2.–Estimated number of chum salmon harvested for subsistence in the Kuskokwim Area, 2007–2017.

Community	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average 2012–2016	Average 2007–2016
Kongiganak ^a	2,353	1,755	1,420	2,522	2,809	1,638	1,397	1,915	–	–	–	1,650	1,976
N. Kuskokwim Bay	2,353	1,755	1,420	2,522	2,809	1,638	1,397	1,915	0	0	0	990	1,581
Tuntutuliak	3,350	3,375	3,330	2,439	1,865	2,614	2,180	2,967	2,143	1,673	2,158	2,315	2,594
Eek	783	788	782	721	486	1,552	1,232	1,182	1,023	681	762	1,134	923
Kasigluk	4,309	1,502	1,857	2,338	2,029	3,261	2,197	3,612	2,080	1,485	2,360	2,527	2,467
Nunapitchuk	6,619	4,705	3,468	3,223	4,257	5,312	2,977	5,213	3,631	2,422	5,035	3,911	4,183
Atmaultluak	2,193	2,177	1,665	1,386	1,864	2,701	2,409	3,327	2,165	1,609	2,090	2,442	2,150
Napakiak	3,628	1,313	1,638	1,759	1,546	1,711	1,185	2,392	1,508	2,091	1,726	1,777	1,877
Napaskiak	3,032	2,400	1,451	3,110	1,783	3,216	2,589	3,171	2,173	1,901	2,355	2,610	2,483
Oscarville	932	847	534	352	402	599	490	599	350	240	261	456	535
Bethel	16,540	15,853	10,055	9,575	15,324	26,872	12,506	18,017	10,958	13,494	17,780	16,369	14,919
Kwethluk	6,291	5,729	4,111	3,112	3,484	3,849	3,825	4,318	2,230	2,326	4,501	3,310	3,928
Akiachak	4,782	6,856	2,872	2,856	3,205	4,150	3,417	4,744	2,085	2,176	3,311	3,314	3,714
Akiak	4,141	3,522	1,350	1,163	2,421	2,925	2,212	2,982	2,348	5,803	3,026	3,254	2,887
Tuluksak	3,202	2,920	1,570	3,180	2,697	2,585	3,062	2,274	1,747	2,698	2,408	2,473	2,594
Lower Kuskokwim	59,803	51,988	34,683	35,214	41,363	61,347	40,281	54,798	34,441	38,599	47,773	45,893	45,252
Lower Kalskag	1,997	1,004	930	691	1,643	3,284	1,214	1,458	1,233	624	1,019	1,563	1,408
Upper Kalskag	294	2,432	329	391	1,599	1,930	1,534	1,038	642	1,055	204	1,240	1,124
Aniak	4,108	2,830	2,602	2,515	2,391	5,667	2,880	4,695	1,395	2,422	1,604	3,412	3,151
Chuathbaluk	1,541	593	937	535	686	796	935	805	342	347	606	645	752
Middle Kuskokwim	7,940	6,859	4,798	4,132	6,319	11,677	6,563	7,996	3,612	4,448	3,433	6,859	6,434
Crooked Creek	813	352	519	539	862	610	1,803	391	383	831	374	804	710
Red Devil	186	188	244	122	434	516	981	284	48	129	121	392	313
Sleetmute	818	373	367	524	689	1,004	542	633	337	268	147	557	556
Stony River	540	1,247	771	338	516	491	27	89	44	14	109	133	408
Lime Village	419	297	405	314	499	419	909	295	–	232	135	464	421
McGrath	464	676	825	944	476	885	598	642	7	150	145	456	567
Takotna	0	0	0	0	0	0	12	0	0	5	0	3	2
Nikolai	223	54	292	440	349	1,044	513	1,356	2,000	205	352	1,024	648
Telida ^a	–	–	–	–	–	–	–	–	–	–	–	0	0
Upper Kuskokwim	3,464	3,187	3,423	3,221	3,825	4,970	5,386	3,690	2,819	1,834	1,383	3,740	3,582
Kuskokwim River Total	73,560	63,789	44,324	45,089	54,316	79,631	53,627	68,398	40,872	44,881	52,589	57,482	56,849

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Community	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average 2012–2016	Average 2007–2016
Quinhagak	2,249	1,794	1,557	1,347	1,255	2,001	1,958	1,959	691	848	1,592	1,491	1,566
Goodnews Bay	395	586	138	324	349	322	153	268	197	219	90	232	295
Platinum	77	106	28	37	70	76	90	62	16	78	188	64	64
South Kuskokwim Bay	2,720	2,486	1,723	1,708	1,674	2,399	2,201	2,289	904	1,145	1,870	1,788	1,925
Total Estimated Harvest	76,281	66,275	46,047	46,797	55,990	82,030	55,828	70,687	41,776	46,026	54,459	59,270	58,774

Note: Dashes indicate harvest was not estimated. Bold font indicates Bayesian estimates.

^a Villages not surveyed in 2017. Harvest was not estimated due to lack of recent data.

Appendix A3.—Estimated number of sockeye salmon harvested for subsistence in the Kuskokwim Area, 2007–2017.

Community	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average 2012–2016	Average 2007–2016
Kongiganak ^a	960	1,502	1,018	1,869	1,266	1,307	1,031	1,230	–	–	–	1,189	1,273
N. Kuskokwim Bay	960	1,502	1,018	1,869	1,266	1,307	1,031	1,230	0	0	0	714	1,018
Tuntutuliak	1,763	2,120	932	2,068	1,274	1,516	1,183	1,774	1,999	1,707	1,438	1,636	1,634
Eek	558	834	1,019	1,241	664	1,490	1,319	1,450	1,111	888	1,266	1,252	1,057
Kasigluk	1,786	1,041	1,215	1,441	1,269	1,451	1,470	1,990	1,442	1,543	1,703	1,579	1,465
Nunapitchuk	2,147	2,549	1,538	1,902	2,223	2,396	1,806	2,059	2,851	2,508	1,570	2,324	2,198
Atmaultluak	1,041	1,250	624	731	827	1,623	1,316	1,531	1,173	1,562	1,535	1,441	1,168
Napakiak	1,962	1,244	917	1,183	1,351	1,141	1,105	1,573	1,179	2,132	916	1,426	1,379
Napaskiak	1,738	2,620	1,579	1,979	1,587	2,065	2,069	2,514	2,022	2,086	1,404	2,151	2,026
Oscarville	712	677	332	250	228	323	347	679	282	329	260	392	416
Bethel	13,902	15,247	11,272	11,103	16,946	18,282	12,616	14,828	11,951	16,730	17,477	14,881	14,288
Kwethluk	3,536	4,920	2,432	2,534	2,357	2,884	2,705	5,921	1,955	2,464	3,257	3,186	3,171
Akiachak	3,269	4,354	2,407	2,433	2,647	3,443	2,594	3,047	2,551	2,726	3,316	2,872	2,947
Akiak	3,695	2,881	1,290	1,161	2,576	1,818	1,731	2,418	1,855	3,772	3,398	2,319	2,320
Tuluksak	1,845	2,133	1,691	2,483	1,699	1,380	1,541	622	1,037	1,249	1,256	1,166	1,568
Lower Kuskokwim	37,955	41,869	27,248	30,509	35,648	39,812	31,802	40,406	31,408	39,696	38,796	36,625	35,635
Lower Kalskag	780	1,583	1,044	507	802	891	977	1,040	487	284	630	736	840
Upper Kalskag	417	1,000	369	460	938	770	662	839	718	1,176	509	833	735
Aniak	1,261	1,585	923	1,165	1,168	1,375	1,466	1,578	2,407	8,380	5,277	3,041	2,131
Chuathbaluk	484	363	564	403	300	297	480	481	382	210	631	370	396
Middle Kuskokwim	2,942	4,531	2,900	2,535	3,208	3,333	3,585	3,938	3,994	10,050	7,047	4,980	4,102
Crooked Creek	523	220	329	302	243	234	514	391	303	264	508	341	332
Red Devil	318	359	477	475	502	511	270	151	88	238	206	252	339
Sleetmute	1,303	1,164	684	1,024	693	715	362	541	497	458	514	515	744
Stony River	1,019	1,476	977	372	303	469	447	137	91	95	138	248	539
Lime Village	1,406	659	1,080	932	739	780	831	888	–	541	325	760	873
McGrath	375	417	965	650	630	233	538	451	0	199	892	284	446
Takotna	1	3	3	2	0	2	2	3	0	5	1	2	2
Nikolai	14	13	66	65	13	0	0	236	400	34	35	134	84
Telida ^a	–	–	–	–	–	–	–	–	–	–	–	0	0
Upper Kuskokwim	4,960	4,310	4,581	3,822	3,123	2,945	2,964	2,798	1,379	1,834	2,619	2,384	3,272
Kuskokwim River Total	46,817	52,213	35,747	38,735	43,245	47,396	39,382	48,372	36,781	51,580	48,462	44,702	44,027

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Community	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average 2012–2016	Average 2007–2016
Quinhagak	1,755	2,097	1,960	1,719	1,582	2,015	2,158	2,939	1,065	1,691	3,850	1,974	1,898
Goodnews Bay	920	1,739	902	1,093	1,328	1,197	1,113	1,370	797	975	677	1,090	1,143
Platinum	121	156	186	175	135	173	181	349	148	381	533	246	201
South Kuskokwim Bay	2,796	3,992	3,048	2,987	3,045	3,385	3,452	4,658	2,010	3,047	5,060	3,310	3,242
Total Estimated Harvest	49,613	56,205	38,795	41,722	46,290	50,781	42,834	53,030	38,791	54,627	53,522	48,013	47,269

Note: Dashes indicate harvest was not estimated; bold text indicates Bayesian estimates.

^a Villages not surveyed in 2017. Harvest was not estimated due to lack of recent data.

Appendix A4.–Estimated number of coho salmon harvested for subsistence in the Kuskokwim Area, 2007–2017.

Community	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average 2012–2016	Average 2007–2016
Kongiganak ^a	883	557	561	483	613	356	412	561	–	–	–	443	553
N. Kuskokwim Bay	883	557	561	483	613	356	412	561	0	0	0	266	443
Tuntutuliak	703	1,620	359	698	250	565	450	794	362	456	472	525	626
Eek	459	661	176	315	280	612	483	555	629	410	797	538	458
Kasigluk	1,753	867	629	1,043	430	303	418	851	446	394	390	482	713
Nunapitchuk	1,752	508	286	195	407	319	226	1,305	1,154	492	1,103	699	664
Atmaultluak	424	262	67	36	263	383	203	176	311	81	415	231	221
Napakiak	1,244	1,006	420	877	927	402	634	740	1,117	506	379	680	787
Napaskiak	639	903	786	1,029	471	269	772	1,153	1,353	726	1,011	855	810
Oscarville	180	62	67	12	43	38	37	128	25	134	82	72	73
Bethel	12,972	15,839	12,895	20,426	18,141	13,280	12,662	19,364	12,277	16,801	17,852	14,877	15,466
Kwethluk	1,624	7,262	4,333	1,495	1,097	1,013	1,555	4,422	1,677	682	2,361	1,870	2,516
Akiachak	2,355	4,311	1,790	1,181	1,440	714	1,106	1,845	1,924	2,007	1,771	1,519	1,867
Akiak	1,325	1,358	661	475	505	455	454	1,501	1,423	2,403	3,566	1,247	1,056
Tuluksak	1,131	635	857	330	163	341	473	808	623	482	668	545	584
Lower Kuskokwim	26,561	35,293	23,326	28,112	24,417	18,694	19,473	33,642	23,321	25,574	30,867	24,141	25,841
Lower Kalskag	515	76	318	96	684	1,107	529	907	419	228	347	638	488
Upper Kalskag	381	2,350	181	92	998	360	636	938	384	722	188	608	704
Aniak	3,003	2,883	2,223	2,533	2,215	3,365	3,102	9,566	7,705	7,530	4,883	6,254	4,413
Chuathbaluk	419	525	96	76	109	179	319	291	166	149	149	221	233
Middle Kuskokwim	4,318	5,834	2,818	2,797	4,006	5,011	4,586	11,702	8,674	8,629	5,567	7,720	5,837
Crooked Creek	289	952	283	87	297	149	255	198	275	298	256	235	308
Red Devil	193	307	126	88	130	238	318	792	214	166	106	346	257
Sleetmute	360	228	403	458	426	784	219	993	752	524	61	654	515
Stony River	336	552	634	201	333	358	120	177	77	29	86	152	282
Lime Village	443	695	210	146	596	117	384	226	–	123	81	213	327
McGrath	279	247	1,175	1,053	1,331	2,257	523	1,189	173	769	663	982	900
Takotna	8	6	28	20	3	22	0	0	53	90	0	33	23
Nikolai	95	53	203	135	20	214	119	256	400	614	99	321	211
Telida ^a	–	–	–	–	–	–	–	–	–	–	–	0	0
Upper Kuskokwim	2,005	3,040	3,062	2,188	3,136	4,139	1,938	3,831	1,944	2,613	1,352	2,893	2,790
Kuskokwim River Total	33,766	44,724	29,767	33,580	32,172	28,200	26,409	49,736	33,939	36,816	37,786	35,020	34,911

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Community	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average 2012–2016	Average 2007–2016
Quinhagak	1,550	1,869	1,824	1,599	1,369	1,380	1,087	2,240	2,238	2,014	1,734	1,792	1,717
Goodnews Bay	468	769	261	319	259	382	295	371	552	378	289	396	405
Platinum	106	114	81	197	143	124	50	240	87	180	273	136	132
South Kuskokwim Bay	2,124	2,752	2,166	2,115	1,771	1,886	1,432	2,851	2,877	2,572	2,296	2,324	2255
Total Estimated Harvest	35,890	47,476	31,933	35,695	33,943	30,086	27,841	52,587	36,816	39,388	40,082	37,344	37,165

Note: Dashes indicate harvest was not estimated. Bold indicates Bayesian estimates.

^a Villages not surveyed in 2017. Harvest was not estimated due to lack of recent data.

**APPENDIX B:
KUSKOKWIM AREA POSTSEASON SUBSISTENCE
SALMON HARVEST SURVEY FORM, 2017**

Appendix B1.-Kuskokwim Area postseason subsistence salmon harvest survey form, 2017.

Date of Survey: _____ Time: _____ **HHID #** _____ **COMMUNITY:** _____ **Data Entry:** _____ **Error Check:** _____

Person Interviewed: _____

Relation to HH: _____ Interviewer: _____

CONFIDENTIAL INFORMATION
2015 Kuskokwim Area Postseason Subsistence Salmon Survey

1. Head of Household: _____ Telephone _____ Address: _____

2. How many people live in your household? _____ Permanent Notes: _____

3. Did anyone in your household subsistence or commercial fish for salmon? YES NO
 (Subsistence "harvest" includes catching or cutting salmon.) YES → Part I, NO → Part II. Adult household member declined to be interviewed.
 Reason: _____

PART I: FISHING HOUSEHOLDS

4. Do you have a catch calendar to turn in: YES NO Already Sent In (Is calendar group or household harvest? Are all salmon recorded on calendar?)

5. Did you fish in a group or did you fish by yourself? Total households (including respondent): _____ Names: _____

6. How many salmon did your fishing group harvest this year? Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

7. How many salmon did your household harvest/keep from the group harvest? Where did you go fishing? (See Map; Not including Permit caught fish) ⚡

Area	Chinook	Sockeye	Chum	Coho	Pink
<input type="text"/>					
Area	Chinook	Sockeye	Chum	Coho	Pink
<input type="text"/>					

8. What is your household's main gear type? (1=primary, 2=secondary, etc.) Set Net _____ Drift Net _____ Fish Wheel _____ Hook & Line _____ Dipnet _____ Other _____

a. Hook & Line? YES NO ; a1. Included above (#7)? YES NO Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

b. other gear _____ b1. Included above (#7)? YES NO Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

c. other gear _____ c1. Included above (#7)? YES NO Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

d. Whitefish Net? **—————→** d1. Included above (#7)? YES NO Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

9. Did anyone in your household commercial fish? YES NO

a. If yes, did your household keep any of the commercial salmon for subsistence? Area _____ Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

b. Are these fish already reported in the household harvest (#7)? YES NO

10. Did anyone in your household lose any salmon (i.e. bears, weather, flies, etc.)? YES NO

Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Reason (s) for loss: _____

a. Are the "lost" fish already reported in the household harvest (#7)? YES NO

b. Were any of the "lost" salmon fed to your dogs (whole fish only)? YES NO ; How many? Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

c. Were extra fish harvested to replace those that were lost? YES NO ; How many? Area _____ Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

d. Are the "replacement" fish already reported in the household harvest (#7)? YES NO

11. Did your household give away any salmon that you harvested (not including spoiled)? YES NO (shared outside of their fishing group)

Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ ; Names: _____

a. Are these fish already reported in the household harvest (#7)? YES NO

75

PART II: ALL HOUSEHOLDS

12. Did anyone give you salmon? YES NO Code: S = Subsistence; C = Commercial; T = Test Fish; P=Permit (community permits)

Code: P Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Names: _____
 Code: _____ Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Names: _____
 Code: _____ Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Names: _____
 Code: _____ Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____ Names: _____

a. Were any of the fish you received fed to your dogs (from question #12)? YES NO Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____

13. How many salmon does your household like to have for subsistence?

Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____
 Why? _____ Why? _____ Why? _____ Why? _____ Why? _____

14. Did your household catch any other fish besides salmon? (From last Sept/October to now.) YES NO

Humpback Whitefish _____ Broad Whitefish _____ Cisco _____ Sheefish _____ Lush _____ Pike _____ Blackfish _____
 Grayling _____ Char _____ Rainbow Trout _____ Smelt _____ Herring _____

15. How many dogs does your household have? _____ (if zero go to question #18)

16. Do you feed whole salmon to your dogs? YES NO Only Scraps

17. Not including spoiled fish or fish you received, how many whole salmon did your household put up for dogs this year? (Numbers should represent whole fish, not scraps)

Chinook _____ Sockeye _____ Chum _____ Coho _____ Pink _____
 a. Are fish harvested for dogs already reported in the household harvest (from question #7)? YES NO

18. Additional Comments: _____

Surveyor Comments: _____

Completed Survey Partial Survey No Survey Survey Reviewed for completeness by Surveyor

**APPENDIX C:
ADF&G CONVERSION SHEET TO ESTIMATE FISH
NUMBERS**

Appendix C1.–ADF&G conversion sheet to estimate fish numbers.

Amount	Description
Salmon	
1 Chinook salmon = 5–8 pound strips	Dried and smoked Chinook salmon
1-gallon Ziplock = 5 pound strips	Dried and smoked Chinook salmon
1-quart Ziplock = 2 pound strips	Dried and smoked Chinook salmon
6 gallon bucket = 4 to 5 Chinook salmon	Dried Chinook salmon
5 gallon poke fish = 25 to 30 chum salmon	Dried chum salmon in seal oil
30 gallon barrel = 150 to 180 chum salmon	Dried chum salmon in seal oil
1 gallon Ziplock = 2 to 3 chum salmon	Dried chum salmon filets
5 gallon bucket = 25 chum salmon	Chum salmon filets, tightly packed
1 dried chum salmon = 2/3 pound	Summer chum salmon for dog food
1 bundle – 50 dried chum salmon	Summer chum salmon for dog food
300 dog salmon/dog/winter	Feeding summer chum salmon to a dog team
1 dried chum salmon = 1.25 to 1.33 pounds	Summer or fall chum salmon
1 pink salmon = 3 pounds	Pink salmon
Other fish	
1 small whitefish = 1 pound	Round whitefish, least, Bering, or arctic cisco, caught in whitefish net (4-inch or smaller mesh) or a fish wheel
1 large whitefish = 4 pounds	Broad or humpback whitefish caught in a chum salmon net (5-inch or larger mesh) or a fish wheel
125 smelt = 5-gallon bucket	
1 gunny sack = 50 to 100 pounds (ask fishermen)	Tomcod, whitefish, herring
14 blackfish = 1 pound	Blackfish
350 blackfish = 5-gallon bucket = 25 pounds	
1 eel = 1/3 pound	Arctic lamprey